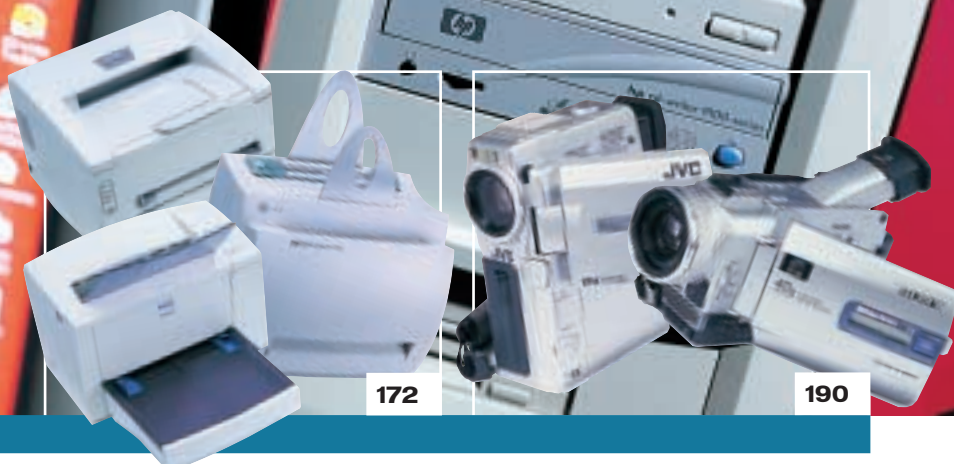


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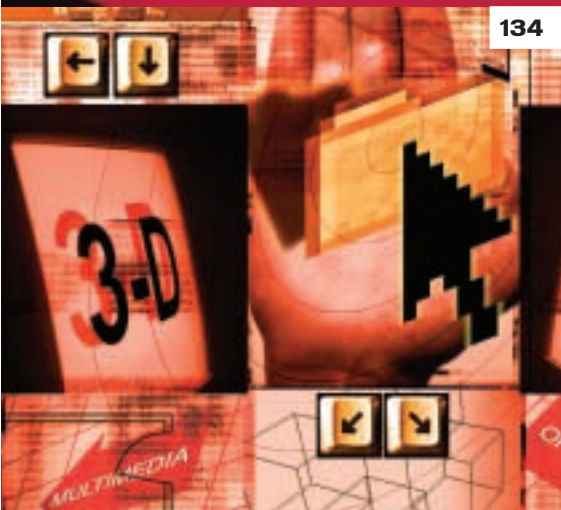
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A lucrative career in IT is no longer a sure thing, but a centralised model may alter that, says Riyad Emeran

Coming full circle



A good friend of mine came to see me recently. He's doing his final year of a computing degree and wanted some advice on what his ultimate goal should be. He had initially wanted to be a C++

programmer, but a couple of years into the course he decided to diversify into other areas such as Java and web development.

We sat for a while, drank several cups of coffee and mulled over the career opportunities that would be open to him when he finally finished his course. We discussed the idea of working for a software application vendor, but the thought of being a small part of a large coding team didn't appeal to him. We tossed around the possibility of web development, but came to the conclusion that this was a somewhat saturated market. With so many people teaching themselves how to create websites the days of professional web developers are probably numbered.

After a while we came to the realisation that computing as an industry does not guarantee the same lucrative career that it once did. When I worked in the industry there was no shortage of jobs at every level, since large computing facilities were the norm rather than the exception. Magazines such as *Computing* carried hundreds of jobs every week for computing professionals – from mainframe computer operators to system automation programmers. Now however, the days of huge computer suites filling entire floors of buildings are a thing of the past and the chances of working your way up from a trainee computer operator into system development, as I did, are slim to non-existent. The world of computing has moved on, and many of the people who were once involved in it have, like myself, also moved on.

A worrying knock-on effect of this situation is that skills that were once commonplace could soon become very rare, or disappear completely. Many times I have found myself in conversation with IT and computing professionals who call themselves systems analysts or system administrators, only to realise that they work in PC support. When I worked in system development the

title of systems analyst meant something much more. These were people who knew multi-million pound computing platforms inside out; people who installed, configured and customised software and hardware to meet specific needs.

Back then a whole team of analysts and administrators were needed to keep large computer centres ticking over. These days everything has shifted to the desktop and the guy who comes to fit your CD-ROM drive is calling himself a system administrator.

That said, things are changing again, and the centralised computing model may yet make a comeback. Microsoft is set to start pushing its ASP model hard this year, with end users paying for time on its applications rather than buying them complete.

If ASPs do become the way forward for software use and distribution, then we'll probably see a return to the large computer centre setups of the mid- to late-1980s.

These days the chances of working your way up from a trainee computer operator into systems development ARE SLIM TO NON-EXISTENT

This will mean that computer professionals will be required to set up and administrate the hardware and software while computer operators will be necessary to keep things running reliably, 24 hours a day. No-one will relinquish physical application distribution if it means they can't use their word processor every time the ASP server goes down.

It's here that the diminishing number of real systems analysts, administrators and even computer operators becomes a problem. If most of these people have moved on to new pastures, finding the right people to once again set up centralised sites could be a problem.

We could end up with a severe IT staff shortage as we did in the 1980s, and those few who have the required skills could find themselves to be very hot properties.

Ultimately, moving computing back to a centralised rather than distributed model should open the door for a new generation of IT professionals, and hopefully help my friend kick-start his career.

Riyad Emeran, Editor in Chief

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Gordon Thorn European Labs Manager
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WELCOME TO THE **MARCH 2001** PERSONAL COMPUTER WORLD COVER DISC

March COVER DISC

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INTERNET

Star of this disc is Micrografx Picture Publisher 7, a powerful imaging application designed for professional-quality photo editing, special effects, and eye-catching web graphics. What's more, it's a full version of the program, exclusive to *PCW*. Also on this disc is Ulead's 'ad-ware' version of the excellent image browser, Photo Explorer; the

new version of Netscape; 10 great new MP3 tracks courtesy of Peoplesound; and more.

(Turn to page 20 for details of extra content for readers of the DVD edition of this month's *PCW*.)



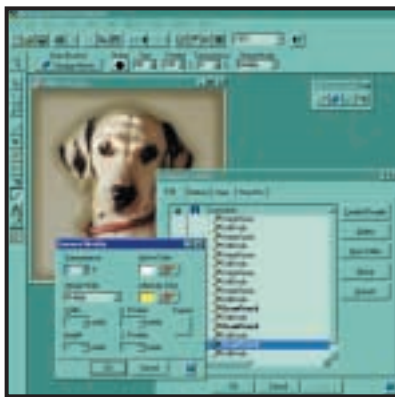
Picture Publisher 7

FULL VERSION

A consistent category innovator since its introduction, Picture Publisher continues to deliver revolutionary new capabilities, many of which can't be found in 'high-end' packages that cost five times as much.

Automated wizards help transform ordinary images into extraordinary graphics. Picture Publisher includes some of the industry's best tools for creating jpeg and gif-formatted graphics files. With its powerful jpeg engine, you can adjust the resulting file size with slider controls and preview the results interactively. You'll get your images right the first time – every time – and at just the right file size (and download time!)

Picture Publisher 7 provides a familiar



Unlimited undo/redo in Command Center

Microsoft Office interface, integrated online tutorials, multiple automated wizards, numerous effects, and large interactive previews. The product also includes the Micrografx Media Manager, which allows you to easily drag and drop files to and from your image libraries.

Picture Publisher 7 helps all users embrace the Internet revolution, with

complete imaging tools and substantial new functionality addressing the complexities of web graphics. Automated wizards help create compelling, effective web content. Enhanced Internet file support and large interactive previews help users create the highest quality, most efficient graphics.

Web-oriented wizards

- **Seamless Texture Creator** creates seamless textures from any image. Spice up web pages with unlimited new backgrounds.
- **Cool Text** produces eye-catching, compound text effects. Use these professionally designed graphics to create exciting page headers.
- **Internet Buttons** quickly produce stylistic buttons from any image.
- **Advanced gif & jpg Savers** permits precise manipulation of gif properties, including transparency dropout using the Color Wand tool and previewing of image quality. The Color Wand enhances user productivity when creating transparent gifs by quickly selecting multiple dropout colours based on colour range. It provides interactive preview of image quality and file compression. Users can verify the quality of their images before loading them in a browser.
- **Batch File Conversion** converts multiple files to gif, jpg, or any other format.
- **Web Pattern Viewer** actively previews textures and patterns while they are created, including sample text and image overlays. This is an excellent way to verify the interaction between web graphic elements.
- **Contact Sheet** produces thumbnail catalogues from any number of selected images. Contact Sheets are frequently used to index other files on a site.
- **Digimarc Digital Watermarking Plug-in** copyrights images on the Internet by embedding hidden watermarks.



Manage your pictures with layers

- **Digital Frontiers Progressive JPG Support** allows files to be saved as optimised, progressive jpgs using award-winning HVS technology. This enables progressive display of images on the Internet.
- **VideoCraft GIF Animator** creates exciting animated gif files by starting from scratch or using existing templates.
- **Map This! Image Map Editor** enables the creation of URL hotlinks from any image. It also makes images interactive on the web, with jumps to other files.
- **Copy HTML Tag.**

Award-winning tools

Picture Publisher offers the comprehensive, powerful tools required by graphics professionals. Precise masking tools, object layers, macro recording, and low-resolution post-processing are just a few of the features Picture Publisher introduced to PC imaging. Version 7 continues to extend the professional's capabilities with Command Center's functionality.

● **Infinite Undo/Redo** records every action applied to an image, allowing extensive command organisation. This gives the user infinite undo and redo actions at any time, editable command properties, branching,



Pick a colour to make graphics look great

grouping, and locating control. Other functions include Comments/Grouping, Edit Command Properties and Edits occurring in that space.

Picture Publisher also includes:

Object Layers, which allows users to create composite images quickly. These objects can be easily moved and edited, allowing constant revisions and creative flexibility.

- Lock/Unlock Objects
- Group/Ungroup Objects
- Object Tool-Tips.



Create thumbnail catalogues of pictures

Powerful masking tools allow for precise selection areas to affect objects or the base image with effects or retouch operations. You can paint masks, draw rectangular or circular masks, draw freehand masks, or draw and modify masks to create paths. Paths can also be exported to clipping paths for use in eps files.

On-Screen Editable Text offers realtime compositing aspects by allowing direct, on-screen edits and re-editing if necessary. Users can edit the placement, size, colour, or angle relative to other image components without having to edit in a separate dialog box.

Macro Recording is where recorded scripts

of commands mark every action the user is performing during the recording process and then are used for playback. Macros give the user unlimited possibilities and speed, since common operations can be fully recorded and played back at any time.

LowRez and FastBits Post Processing allows all commands to be recorded during LowRez mode and played back on the HighRez image. FastBits is the modification of 'chunks' when a whole image is too large to be edited at one time. The use of the LowRez and FastBits tools allow users to speed up workflow instead of waiting on processes to apply on very large images.

Grids, Guides and Snap Points are the new layout tools that offer alignment controls to quickly plot out locations of objects, masks, brush strokes, and other common image-editing operations. Layout tools give the user more power when positioning objects or operations by giving correct spacing amounts and by aiding in alignment.

Over 50 artistic special effects and filters allow users to quickly create professional image enhancements.

Interactive Visual Previews allow you to edit confident that the desired result will equal what has been chosen. The EffectsBrowser offers preview, multiple applies, and reset. The ImageBrowser gives a thumbnail preview of images before they are opened. The QuickZoom window helps you zoom and pan to navigate through the image.

Image Spray 'paints' out Picture Publisher objects from a pre-existing Picture Publisher Format File (ppf). Objects are very quickly painted out with the option of turning off certain objects in the collection, spray order, overlapping, and scaling.

Enhanced Paint and Texture Brushing lets you select from a wide variety of stock artistic brush styles ranging from Crayons and No 2 Pencils to Calligraphy Pens and Smudgy Markers. The Brush Styles palette can be undocked for quick selection of paint tools, edit brush styles, or to add custom brushes. You can quickly achieve natural paint effects without further tool modification.

Ease-of-use enhancements

Picture Publisher has long been the leader in easy-to-use, powerful, full-featured image-editing applications. While version 7 provides a complete range of robust imaging capabilities, it continues to be easy to use.

Microsoft Office compatibility gives Picture Publisher the general look and feel of Office applications. A familiar Office interface helps you learn and remember common command locations.

Welcome Dialog speeds up the process that you go through every time the application is launched. It is a 'quick' launch into the image-editing capabilities of the application.

Over 60 special effects, filters, and stock macros enable quick and professional image enhancements. Stock macros take this one step farther by making combinations of effects into professional operations.

Step-by-step integrated tutorials teach you common image-editing operations as well as tool locations and tool functionality.

Micrografx Media Manager organises, collects, and allows for drag and drop of many different file formats into a Picture Publisher image. You don't have to go through the lengthy process of opening and copying other pieces in an image since drag and drop can be used.

Automated Task Wizards and Macros – over 25 new creative effects. These wizards



Image Spray paints out ppf objects

automate tasks unlike macros in that they offer an interactive and friendly-to-use interface. Operations that could encapsulate hundreds of commands in the past have been automated into easy, understandable, interfaces with status feedback. These wizards bring professional compound effects to any user whether novice or professional.

Creative effects include: Drop Shadow, Cool Text, Page Edges, Contact Sheet, Internet Buttons, Internet Page Separators, Texture Creator, Common Palette Generator, Photo Fix (edit tools), Red-eye Removal, Image Tone, Puzzle Pieces, and Batch File Converter.



Drag and drop other file formats

Picture Publisher 7 tutorial

To give you a taste of Picture Publisher and to get you started, here's a sample borrowed from the many excellent tutorials you'll find in Picture Publisher 7. This one uses the cloning brush to remove scratches from old and damaged photographs.

A common use for Picture Publisher is restoring old photographs by retouching. In this tutorial, you'll learn how to retouch a damaged black and white photograph using the Clone tool.

While retouching an image is not difficult, it does require patience. You must proceed slowly and make changes to the image in small increments. Large changes often look unnatural and are difficult to control. Use the QuickZoom window to move around quickly in the image and to view the changes on the entire image.

On the File menu, click Open. The Open dialog box opens. Double-click the file retouch.jpg located in the Tutorial folder of the Picture Publisher folder. The file opens.

On the View menu, click QuickZoom. The QuickZoom window opens. Resize the QuickZoom window by dragging its bottom left corner until it fills about one-quarter of the Picture Publisher screen. The QuickZoom window always maintains the aspect ratio of the full image.



Open the old, damaged photograph

Move the pointer inside the QuickZoom window and drag a rectangle in a damaged area of the image. The image zooms into the area you selected. Press and hold the right mouse button to reposition the rectangle while drawing.

Tip: You can move quickly to another area in the image by clicking in the QuickZoom window, or you can drag another rectangle in the QuickZoom window if you want to zoom in or out of the image.



Open and resize the QuickZoom window

Retouching with Clone tool

Now that you have zoomed into a damaged portion of the image, you can begin using the Clone tool to retouch the damaged area. The Clone tool lets you use adjacent areas to copy or 'clone' over the damaged areas.

The Clone tool consists of two brushes: the source brush and the destination brush. The source brush, marked with an X, indicates the source of the clone and the destination brush indicates the location where the copy will be placed.

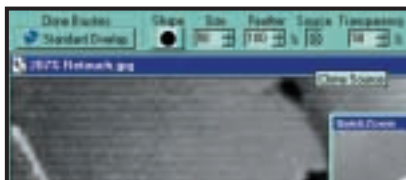
Click the Retouch tool in the Main toolbar. Click the Clone tool.

In the Feather box in the ribbon, type 100 (see picture below).

Move the Transparency slider in the ribbon to 50 per cent.



Click the Clone tool



Set Feather, Transparency and Source

Click the Source button in the ribbon. Position the source brush close to the damaged area in the image and click the left mouse button to set its position. Position the destination brush in a damaged area

near the source brush and click the left mouse button. A small area from under the source brush is copied to the area under the destination brush.

Move the Clone tool a small distance and click the left mouse button to 'dab' more of the adjacent area over the damaged area.

Press Shift to move the destination brush a small distance. Pressing Shift lets you move the destination brush without moving the source brush. Release Shift to continue cloning. The secret to successful cloning is to clone in small increments while frequently changing the location of the source and destination brushes. Be sure to clone areas from both sides of the damaged area.

Click the left mouse button to clone



Clone in small increments for a good result

another small area. While moving throughout the image with the QuickZoom window, repeat the previous steps to remove the remaining damaged areas in the image.

On the File menu, click Close. Click No when prompted to save the image.

Tip: If you have zoomed to a different location and the brushes are not visible, click the Source button again and click in the image. Then click to place the destination brush. The striped areas in the image can be cloned by placing the source brush over a 'good' stripe and moving the destination brush over the area that should be striped. You may also have to change the size of the brushes to fit into 'tight' areas of the image.

The 'fixed' image at the beginning of this tutorial was retouched using only the Clone tool. Depending on your success with this tool, you may also have to retouch the image with other tools such as the Smear or



PICTURE PUBLISHER 8

SPECIAL OFFER

The fastest and easiest image editing available today, Picture Publisher, has been described as 'The best price/performance deal in image-editing software.' Picture Publisher 8 now adds mind-blowing web graphics to your PC, plus a stack of functionality once confined to the photographic professionals.

There is a vast array of high-end image-editing tools, with the breadth and depth of functionality that allow you to produce outstanding results from your digital camera or scanner. With a comprehensive set of tools and content for photo retouching, image creation, digital painting, web graphics, and more, Picture Publisher can do everything you need – and then some.

Version 8 helps you harness the power, with industry leading ease-of-use among high-end image-editing applications. No other software combines professional power tools with the level of approachability found in Picture Publisher.

Creating mind-blowing graphics becomes fast and easy with exclusive cutting-edge features and comprehensive functionality for professional image editing. Picture Publisher has long been the leader in easy to use powerful, full-featured, image-editing applications. Version 8 continues this advantage with its MS Office 97-compatible interface, automated wizards, tutorials, and tool presets. The addition of substantial new web functionality helps address the complexities of Internet graphics, including web styles templates, an



Upgrade now to Picture Publisher 8 from Micrografx FOR JUST £49 plus VAT

integrated animated gif editor, progressively rendered jpegs, advanced palette control features, and the Web Output Wizard.

This is a powerful image-editing

application that offers approachable tools for professional web graphics, photo retouching and creative image design. Among Picture Publisher 8's astounding range of features you will find:

- 30-plus interactive wizards and online tutorials
- 55-plus import/export file formats
- 120-plus effects and creative macros
- Digimarc Digital Watermarking Plug-in
- Kodak ICC Colour Management System
- Media Manager 8 – drag and drop content management utility.

Buy the full version of Picture Publisher 8 and add:

- 10,000-plus royalty-free stock photos and clip-art images
- 500-plus seamless Internet textures
- 250-plus TrueType fonts
- 250-page-plus user guide.

UPGRADE HOTLINE: 0990 275 422
Please quote part number: GR10341
Price: £49 ex VAT

For more information on Micrografx PicturePublisher 8 and where to buy your copy, visit www.micrografx.com/mgxproducts/PicturePublisher.asp.
For business and volume licensing call 01483 747 526.

Using the cover disc

The PCW cover disc uses a web-browser-style interface. As well as cutting the time needed for development, content designed for the web can be easily ported to the disc (and vice versa).

Compatibility issues are reduced as your browser has been installed to work on your individual PC. However, to get full functionality from it, you'll need to use Microsoft Internet Explorer (version 4 or later). This is because we use a special ActiveX plug-in that allows us to install software directly from the browser, without all the usual options, dialogs and security warnings.

Unfortunately, Netscape doesn't properly support this software. For non-Microsoft users, we've included a small installer that will run when you insert the disc, or when you run the



program pcw.exe in the root of the disc. Of course, you can still launch the main browser to read all about the software on this month's cover disc.

IMPORTANT

Please note that we cannot give support on individual programs contained on this disc. Should you have problems running the disc or any of its content, please note the following guidelines:

- **Faulty disc** (ie, the disc is physically damaged and will not load) – return the disc for a replacement to: PCW March cover disc, TIB plc, HelpLine Returns, Unit 5, Triangle Business Park, Pentrebach, Merthyr Tydfil, Mid Glamorgan CF48 4YB quoting ref 'PCW Vol 24 No 3'
- You have problems installing/running the software. Check the support page on the CD, or the support website at www.pcw.vnuet.com/cd. You should also check the manufacturer's website
- For general difficulties call 01685 354726
- If you're still stuck, drop us an email at pcwcd@vnu.co.uk – we may be able to help.

Peoplesound... Netscape 6... and more

Peoplesound.com MP3 top 10

Peoplesound is the definitive source of great new music online from thousands of quality artists. Listen to some of the hottest new sounds around at www.peoplesound.com. Each month on PCW's disc you can enjoy 10 top complete tracks from peoplesound.com in MP3 format, all neatly wrapped into an easy-to-use interface.

On this month's disc

- Dr Fink – Feel It: Fink is a master of understated chic; creating a stylish sophistafunk that is all his own.
- Neuroport – Codec: 9 (Embrace The Future): Tough trancing from Neuroport.
- Embers – Revolt Into Style: A wonderfully mutant cross between classic late 1970s post-punk tunes and ultra modern indie.
- The 57th Dynasty – Lil Bro: The 57th Dynasty live up to their reputation as one of the leading exponents of the hip hop form.
- R.S.L – Bad Day: Often poignant and always intriguing accompaniments to their state-of-the-art beat treats.
- Kes – So Hard: Large sound constructed with a deadly efficient sense of melody.
- Headeetail – Is This Love?: The product of a diverse cultural background, Headeetail incorporates a rich array of influences into his unique sound.
- Eclipse – Did I ever (Europop mix): Dance beats combine with infectious synth runs, uplifting vocals and arresting dynamics.
- Harri Lake – Stranger Than Love: Ms Lake's velveteen crooning owes as much to the more sultry side of chart pop as it does to the West Country beat brigade.
- Jont – The Book That Never Touches The Ground: Emotional and earthy acoustic-based songs from a man with a voice that just deserves to be heard.

NEW Xara X (30-day trial)

Xara's updated illustration package for Windows is designed to compete with Fireworks and Illustrator. This fast and powerful graphics creation package combines both vector and bitmap graphics,

NEW Netscape 6 (full version)

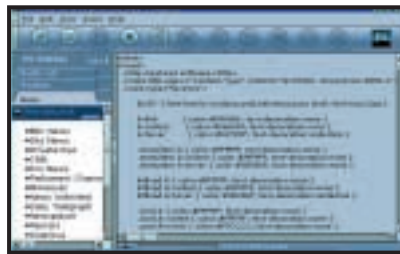
Netscape 6 claims to revolutionise Internet browsing by providing an easier and more personal way to use the net. It's designed



Xara X is powerful, fast and easy to use

around the things people do the most online – browsing, searching, email and instant messaging – and brings them all together for a convenient and customised experience.

New features, such as My Sidebar and improved Search capabilities, will enhance your Internet experience. Netscape 6 offers industry-leading standards support, enabling cross-platform development of rich web content and applications.



Netscape 6 offers features like My Sidebar

Built on the innovative Netscape Gecko browser engine and sporting a new look, Navigator is smaller, faster and fully standards compliant. Navigator has innovative new features to help you find things and stay connected to important information.

Ulead PhotoExplorer

Get photos from digital cameras and memory card readers automatically with the Digital Camera Wizard. Organise and make image adjustments to them. You can display photos full size and step through photo collections; print thumbnail indexes or full-sized prints. You can also share photos on the web in one step via iMira.com; just drag

them onto the Drop Spot. View photos in a slide show, send them in email or export them to web pages. Create colour reprints in a wide range of sizes on your colour printer. Colourful toolbars and thumbnail images make using program functions easy. Visually browse through many file types.

This banner-ad version of Photo Explorer 6.0 is fully functioning, free software. It never expires. Users also get a free account on iMira.com, Ulead's photo sharing and services website.



Share photos on the web with iMira.com

Ulead ArtTexture

(Photoshop-compatible plug-in)
Create custom textures based on a gradient by combining various textures, and build up your own collection in the Library. You can even create gif animations using multiple textures.

ArtTexture.Plugin works with Adobe Photoshop 3.x/4.x, JASC Paint Shop Pro 4.1+, Microsoft Image Composer 1.5, Corel Photo Paint 6.0+, and other imaging editors compatible with 32bit Photoshop Filter and Acquire plugin technology.

Fandango 2 (30-day trial)

Create your own Windows screensavers or standalone animations for disk or Internet with this screensaver designer. You need no special knowledge or programming skills.

After your 30-day trial has expired, the program will continue to function for a further 30 days. Screensavers created with this evaluation version will also expire at the same time (ie 60 days after installation). Fandango 2's Help system requires Internet Explorer 4 (or greater) to be installed.



PCW COVER DISCS BROUGHT TO YOU IN ASSOCIATION WITH:



What's on the DVD

If you're one of the lucky DVD-ROM edition readers, you get everything described on the previous CD pages, plus all the great programs below – including the brand new version of Red Hat Linux (requires CD burner), 21 brilliant playable games demos, a year's worth of PCW group tests, and loads more. Read on...

NEW Red Hat Linux 7.0

This is the newest addition to Red Hat's line of award-winning operating systems. It features OpenSSL with 128bit encryption for secure web communication; USB support for mice and keyboards; cleaner, faster, more customisable desktop; graphical firewall configuration; and it's 2.4 kernel ready.

Read the instructions BEFORE installing.

Please note, this installation is supplied in the form of two ISO 9660 image files. Before you can install the operating system, you must burn the contents onto a CD.

Make sure you visit the Red Hat webstore at www.europe.redhat.com/shop



Microsoft Visio 2000 (60-day trial)

Microsoft's Visio is a drag-and-drop diagramming tool, helping you create intuitive, high-impact documents. Visio 2000 enhances your business communications with a powerful visual element, to help you get your point across clearly and succinctly. Gone are the days when you had to struggle with several sheets of A2 paper, scrawled over with marker pens, in order to present your vision of the new organisational structure, let alone trying to document it afterwards! Visio 2000 Standard contains easy-to-use tools for creating organisation charts and flowcharts, timelines, calendars, office layouts, block diagrams, and sales and marketing visuals.

Satori PhotoXL 2.29

Imagine painting on a canvas 6,144 x 4,096 pixels, in true colour and multi-layers, on a modestly equipped PC – without everything being reduced to a snail's pace. Satori Resolution-Independent graphics technology makes it possible for you to work

Satori PhotoXL

Please note: during the installation of Satori PhotoXL, you will be required to input the following serial number: A3008-X812826.



Create professional-looking images fast

efficiently with unlimited numbers of image layers at any resolution or size.

Layers allow professional image montages to be created quickly and easily. You can make changes at any time and enjoy output results with superfine sub-pixel accuracy, and even think of Satori as more like a vector graphics package.

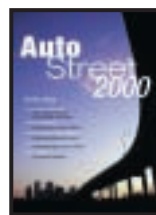
All the work you do in Satori is defined as resolution-free editable objects. Objects are brushes, shapes, text, transformations and other effects. It is these scalable object 'actions' that are combined to create the final output image. Find out more on the disc about some of Satori PhotoXL's unusual features and possibilities, to install the full version 2.29, and to read about the latest upgrades. Visit the Satori website for the latest info and updates.

AutoStreet 2000 Lite

(Full version, worth £19.99)

This powerful new routeplanning software comes with the following unrestricted features:

- Latest Ordnance Survey map data
- Calculate shortest routes
- High-resolution raster maps
- Five levels of zoom, plus IntelliZOOM technology
- Over 220,000 named features and places of interest
- New multi-direction and multi-speed scrolling
- Push-pin database of petrol stations
- Laptop zoom feature – up to 400 per cent



Songplayer 2.5

(plus 'Medication' by Primal Scream) This musical instrument tutor uses your CD collection. Instead of using a conventional music score, it uses simple graphics that illustrate, beat by beat, each chord in a song.

The software uniquely synchronises to your CD album, enabling you to hear and see exactly how to play, making the learning process far more enjoyable and effective.

To learn a song simply download the relevant 'song file' and load into the software. Each song is available in demo and full versions from the Songplayer website (www.songplayer.com).

Ulead Photo Library

Ulead Systems' Stock Photo Collection 1 includes 769 royalty-free stock photos for your personal use. These images are in jpeg format and are ideal for brightening up your website or other screen-based presentations. The library covers a wide range of categories, including animals, architecture, art, flowers, food, landscape, music, nature, people, sport, and transportation. Use any image browser, or Ulead's PhotoExplorer to view and organise your collection. Images are in \software\ulead_photocollection.

Playable games demos

You'll find 11 of the latest games, plus our round-up of our 10 favourites from the past six months – our biggest-ever games selection. Definitely worth giving a spin are the much vaunted American McGee's Alice and, yes, it was worth the wait. There's also a brand new Tombr Raider; Quake III: Team Arena; and the wonderful long-awaited Sacrifice. Here's the full list: Sacrifice, American McGee's Alice, Quake III: Team Arena, Super 1 Karting, NASCAR Racing 4, Midtown Madness 2, Dave Mirra Freestyle BMX, Tomb Raider: Chronicles, Space Haste, MotoCross Mania, Project IGI.

And those golden greats:

Heavy Metal: FAKK 2, RealMyst, No One Lives Forever, Evolve, Crimson Skies, Rollcage Stage II, Sierra Sports PGA Golf 2000, Ground Control, Need for Speed: Porsche Unleashed, Arabian Nights Complete Episode 1: Melissa's Letter.

Don't forget, we've also got more than 50 must-have programs and utilities, in our Essentials section; plus more than a year's worth of PCW product group tests (in Adobe Acrobat format).

Starting the DVD-ROM

The DVD should auto-start, just like the CD. If it doesn't, double-click the DVD-ROM icon in My Computer or, alternatively, run the file pcw.exe on the root of the DVD. Check out the support website at www.pcw.vnunet.com/cd for late-breaking news on the programs on the disc

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IT gets a reality check as nerds go out of fashion

The new year got off to a shaky start, following the burst of the dot-com bubble, with falls in the value of high-tech stocks and a slowdown in PC sales. There were stories of US companies dropping 'dot com' from their names to avoid the taint of failure; while there was relief for reclusive computer nerds, who could now return to obscurity after an unlikely spell of being fashionable.

Some pundits even pronounced the net a flop, ignoring the fact that most of the developed world couldn't function without it. We now take the Internet for granted, which is as it should be.

The dot-com bubble took on a frenzied logic of its own, but it was rooted in an underestimation of the complexity of the changes involved. We have not even worked out satisfactorily how to make payments on the web, certainly not to the small-change level that would allow a full range of economic activity. And we are still trying to figure out how money is to be made online at all (see Ian Burley, page 48).

The Bluetooth camp has also taken on something rather more complex than was envisaged (see page 49).

It took years for people to get used to the telephone; it

could take decades before we exploit fully the vastly greater potential of modern communications systems.

Meanwhile, we may have to accept a slowdown in innovation, if only because the profits won't be there to fund it. Software developers already struggle to sell upgrades on the basis of new features.

A straw in the wind here could be Intel's release of a slower, cheaper Pentium 4 (page 26) in a bid to kickstart sales. If Intel cannot sell innovation, the point will come when it can no longer afford to innovate (see page 41). The company is diversifying heavily to protect itself, notably into wireless technology in partnership with Symbol (page 27) and non-PC chips (page 40).

It still dominates the \$200b-plus global semiconductor business and AMD, perceived as its main rival, does not even appear among the top 10 (page 26). AMD is among a minority that, between them, own 51 per cent of the market with sales that grew collectively last year by 35 per cent – three times the rate of Intel.

Among these are the companies that make the specialist chips, many based on core designs from Britain's ARM, that will power the new generation of devices, which will feature in these pages over the coming year.

CLIVE AKASS



Gates' Xbox rewrites rules for gamers

Bill Gates has unveiled Microsoft's forthcoming Xbox game console which is scheduled to launch in Europe early next year. Microsoft claims the performance from its 733MHz CPU and 250MHz custom-built nVidia graphics processor is three times that of Sony's PlayStation 2.

Microsoft has admitted that the 125 million polygon-per-second performance is half that originally announced and 'only' twice that cited for the PS2. Xbox general manager J Allard was quoted as saying that

what mattered was the gaming experience, and he was confident that this would be three times better than the Sony rival's.

The Xbox, like the PS2, will have a DVD drive but this will be available only for gaming out of the box. You will need to buy a special remote control, costing around £20, to unlock the device as a movie player. This is apparently to avoid licensing fees on the main product.

Gates unveiled the machine at the Consumer Electronics show in Las Vegas. He claimed: 'Xbox will set the standard in gaming for years to come'.

Bug watch on Linux 2.4

The delayed Linux 2.4 kernel, classed as a major upgrade, has finally been made available but faces testing times. Linus Torvalds, the 'father of Linux', signed it off with the words: 'Don't bother reporting any bugs for the next few days. I won't care anyway.'

But bugs are what it's all about. The kernel now promises symmetric multiprocessing scalability to attract corporate users. It also supports IA-64, IBM's S/390 mainframe, and has expanded driver support for hardware like USB and 3D graphics cards.

George Weiss, OS research director for Gartner, said: 'Users don't run mission-critical applications on .0 releases. It will be at least six to nine months, maybe even a year, before we can judge whether it lives up to its reputation.'

ISP shake-out continues

The shake-out of web service providers continued into the New Year, with Liberty Surf admitting that it was considering closing its UK operations.

Users of Brentford-based Free Dot Net lost their email service but the company said as we went to press that it was still operating. It could not say when service will resume.

Ailing Breathe.net, which offered unlimited access to £50 subscribers, has been bought by Great Universal Stores, owners of Argos for \$1.4m. But GUS will not take on its liabilities.

NTL cable users look to have the best broadband web deal: £19.99 a month if you buy a modem, or £24.99 if your rent one.

Intel bets on cheaper P4

Intel has launched a 1.3GHz Pentium 4 at half the price of the 1.4GHz and 1.5GHz launch versions. The new chip, which costs \$409 (£256) to big buyers, pitches the chip at the mainstream market now dominated by the PIII.

The move could put the P4 into machines costing little over £1,000. It is seen as a high-risk strategy for Intel, because the P4 is larger than the PIII and therefore more expensive to make.

The P4 has come in for some heavy criticism, with accusations that Intel had launched it before it had met its design goals. More to the point, for users, may be the fact that software that is not

optimised for the P4, which means virtually all software, gains little advantage from the new



chip and in some cases may even run slower.

Something similar happened with the very first Pentiums, which ran some code slower than the 486 chips they were supposed to supersede. The chips soon speeded up, and Pentium-

optimised code quickly became available.

The difference then was that software was leading hardware, in that it needed more power than the current generation of chips could provide. Today, the reverse is the case and, unless or until power-hungry new applications go mainstream,

there may be no great incentive for people to pay a big premium for processing power they don't need.

Another drawback of the P4 in the price-sensitive mainstream market is that currently it needs costly RAMBUS memory. This could give an edge to rivals such as AMD's Athlon.

www.intel.com

Cellphones drive chip sales

Chip sales rose 31 per cent to \$221b (£138b) last year despite signs of a slowdown in PC sales, according to preliminary results from analysts Gartner Dataquest.

The majority of the rise was due to memory and cellphone chips, as well as those used for web infra-

structure. Relatively poor sales in the final three months of the year had led to some despondency, according to Joe D'Elia, director of European semiconductor research. But there was no reason to suppose the slowdown was due to any reason other than companies unloading high inventories.

Intel still dominates with 13.4 per cent of the total market. But this was down from 15.8 per cent in 1999 because of a slowdown in PC sales. Its sales rose 'only' 11 per cent to \$29.8b.

By contrast Toshiba chip sales rose 47.2 per cent to \$11.2b, as its investment in memory chips paid off, wresting the number two position from NEC.

America, consisting of both North and South, remained the largest chip market, with sales up 29 per cent to \$71.7b; Asia/Pacific, excluding Japan, was the second at \$56.9b; Japan was third at \$50.4b, and Europe had \$43.1b in sales.

'The Q4 slowdown was strongest in the Americas region, and it was a major factor in the lower-than-average growth experienced in the region,' said D'Elia.

Top semiconductor vendors by worldwide revenue

1999 rank	2000 rank	Company	1999 \$m sales	2000 \$m sales	2K market share %	Growth (%)
1	1	Intel	26,806	29,750	13.4	11.0
3	2	Toshiba	7,618	11,214	5.0	47.2
2	3	NEC	9,210	11,081	5.0	20.3
4	4	Samsung	7,125	10,800	4.9	51.6
5	5	Texas Instruments	7,120	9,100	4.1	27.8
6	6	Motorola	6,394	8,000	3.6	25.1
9	7	STMicroelectronics	5,077	7,948	3.6	56.5
7	8	Hitachi	5,554	7,282	3.3	31.1
11	9	Hyundai	4,830	6,887	3.1	42.6
8	10	Infineon Technologies	5,223	6,715	3.0	28.6
		Others	84,179	113,305	51.0	34.6
		Total market	169,136	222,082	100.0	31.3

PDA's that read your paper

Symbian partners Ericsson and Motorola are looking at a low-cost scanner module that would allow mobiles to read data from paper.

The sugar-cube-sized module is made by Symbol, which specialises in bar-code readers including portable wireless-linked models used to check stock in warehouses.

There have been several attempts recently to produce a mobile machine/paper interface. HP's Capshare handheld scanner, which stitches together part-scans to provide a full picture, was too expensive to find a mass market. It was also a little cumbersome, especially if you try to carry it around in your pocket in addition to a phone and a PDA.

Another approach is the



The contact details for John Vacarro, VP of mobile and wireless systems at Symbol UK, as printed on the back of his business card

smart pen, which can scan line by line. A problem with some of these is that they cut down memory needs by translating scanned print into text – and optical character recognition (OCR), though generally good, is not perfect.

You need at least to be able to compare the scanned and translated images before discarding the bulky graphical data. Even if you can do this on a pen, editing data on such a device is awkward.

Bluetooth will enable smart pens to dump data straight to a mobile or desktop with more memory, power and better editing facilities. The Symbol module, costing between £20 to £26, could put the same functionality directly into a mobile phone or PDA.

It could also lead to a wider use of bar codes for contact details and web addresses. Text can be encoded using Symbol's 417 two-dimensional bar code (pictured above), which can be read by desktop scanners as well as dedicated modules and translated without the uncertainties of OCR.

- Intel has licensed Symbol's 802.11b technology for its new range of wireless LAN products.

www.symbol.com

Apple cuts prices to the core

Apple slashed prices across its range of products at the New Year in an apparent bid to clear stocks after disappointing pre-Christmas sales. The company also faces a price war from PC dealers who are also stuck with excess stock.

The biggest price cut was on the 500MHz G4 dual-processor model, which dropped 26.5 per cent to £2,114. Prices of its 450MHz and single-processor 400MHz siblings, and the G4 Cube, dropped around 20 per cent to £1,644, £1,056 and £1,174 respectively.

All prices include VAT but not a monitor. Percentages are based on ex-VAT prices.

Other new prices, with percentage cuts in brackets, are: PowerBook 400 £1,644 (17.7 per cent); PowerBook 500 £1,879 (15.8 per cent); 450 ASIP, 500 ASIP and 500 OS X servers respectively £2,055 (16.7 per cent), £2,584 (24.1 per cent), and £2,584 (24.1 per cent).

Sony crams 9.1GB onto 5.25in discs

These two new Sony 14-speed optical drives can read or write to 5.25in removable discs packing no less than 9.1GB. Sony claims they have a near hard-disk performance with a read rate of 6Mbytes/sec and an average seek time of 25ms. They can also handle 5.25in discs of earlier models and lesser capacities. Sony says the media can be overwritten a million times with no loss of quality. The SMO-F561, the internal version, costs £1,436 ex VAT, while the external RMO-S561 has yet to be released. www.sony-cp.com



Soft soap for coders

Microsoft is offering free downloads of two new tools using its Simple Object Access Protocol (Soap) to facilitate the creation of web services.

One is a beta of the Soap Toolkit Version 2.0, which adds Soap features to the Visual Studio 6.0 development environment. Soap defines how to encode an http header and an XML file to allow a program in one computer to communicate with one in another.

The second tool is the Web Services Behaviour for IE5.0 which allows developers to aggregate web services from multiple web pages. Both can be found at www.msdn.microsoft.com/soap.

Textual love is in the air

Mobile phone users have been indulging in 'text sex' in the belief that they can press all the right buttons through SMS messages, according to a survey by mobile software provider Magic 4.

It claims that sexy messages and raunchy ASCII graphics are creating a new concept of 'textual foreplay' and that no less than one

in two UK users have fallen for a textual chat up. There is a down side though. Around one in six women said they had dumped a boyfriend by SMS, and nine out of 10 men have used the system to lie about where they are.

Germans are the most adventurous users, with nearly 80 per cent claiming to have used the pulling power of SMS messages.



She's dumped me for another mobile phone

Digi-images in photo finish

Film and digital still camera technologies are converging as high-street photo specialists seek ways to maintain revenues with the decline of traditional processing.

Swiss company Gretag has built a minilab around a dual-Pentium III PC. The minilab processes and prints conventional 35mm and APS film as well as images from 'digital film', such as SmartMedia or Compact Flash memory cards, CD-ROMs and floppy disks.

The Netprinter Digital Station 'prints' digital as well as film images on photosensitive paper, rather than using a laser or inkjet printer, and the results I have seen certainly bear out Gretag's faith in the traditional medium.

Digital images are projected onto the paper using Texas Instruments' DLP (Digital Light Processing) micro-mirror chip, found in many of the latest digital projectors.

The PC has massive hard disks to store digitised images for printing and uses negative/transparency and flatbed scanners to process the original prints. Sophisticated image manipulation and colour management software is used to optimise image quality.

IAN BURLEY

www.gretag.com

Self-heal PCs

IBM is to equip new PCs and notebooks with online tools that it believes will make them 'self healing'. The eSupport technology, licensed from Support.com, will be featured in its ThinkPad, NetVista, IntelliStation xSeries ranges.

Users will be able to access diagnostic applications via an online portal.

LAW

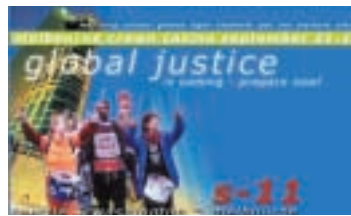
Nike sued for hack costs

Legal action over a cyberprotest against sportswear giant Nike could leave web users with lax security open to prosecution.

For 46 hours last June, crackers managed to divert all Nike's web and email traffic to an Australian activist site (see caption) via Edinburgh-based service provider FirstNET Online, which also runs a redirection service.

Now FirstNET is suing Nike in the Scottish courts for £25,000 – the cost of rediverting 1.25 million messages to their original target. It claims Nike, which has been accused of profiting from cheap labour and poor working conditions in Third World countries, commissioned it to redirect the mail.

But, in a groundbreaking move, FirstNET is also suing Nike in the US on behalf of its own users for denial of service



Protesters diverted Nike traffic to the site of a group called S11 (www.s11.org), which was helping to organise a protest against globalisation at a World Economic Forum meeting in Melbourne on 11 September last year. The screenshot dates from that time

(DoS) caused by the protest traffic on the grounds that Nike did not adequately protect itself.

The Nike protest was not a classic DoS attack, where servers are flooded with calls generated by rogue code – usually in the form of Trojan horses sneaked into machines of unsuspecting users.

Virtually any online device

can thus be tricked into joining a DoS attack, provided crackers can get a Trojan on to it. If US courts back FirstNET, the unsuspecting owner could be sued for negligence.

FirstNET MD Greg Lloyd Smith said he had to sue in the US as Scottish law does not place so much stress on individual responsibility. His test case will argue that the Nike servers were an 'attractive

nuisance' like a swimming pool. 'In the US, if a child falls in the owner of the pool can be held responsible for not taking adequate precautions'.

Only FirstNET users will gain if the action succeeds, he said. 'It will cost the company money. But if it makes people take a closer look at security it can only be good.'

www.firstnet.eu.com

Yahoo backs down in Nazi case

Search portal Yahoo has pledged to bar Nazi paraphernalia from its US auction site in a move that it said was due to protests from users.

But the move follows a seven-month legal battle in which Yahoo failed to persuade a French court that it was technically impossible to stop French citizens from viewing such material on its US auction pages. Selling Nazi material is not illegal in the US, but it is in France.

The ruling, if upheld in the US, would have considerable implications as it would give foreign countries jurisdiction over material that is held on servers in the US. This could affect disputes involving Britain, for instance in libel cases.

Allegedly libellous material has, on more than one occasion, been moved to US servers at the whiff of a court action in Britain. Yahoo is trying to get a US court to rule that this is not the case.

However, the new ban, which took effect on 10 January, meets the spirit if not the letter of the French court's ruling. Evidently Yahoo is tired of seeing its name associated with Nazis. It issued a statement that it 'will no longer allow items that are associated with groups which promote or glorify hatred and violence to be listed on any of Yahoo's commercial properties... prohibited listings include items such as Nazi and Ku Klux Klan memorabilia'.



This poster was among the Nazi-era items on sale at the Yahoo site before the ban

● Yahoo has followed rivals in introducing a fee of between 20 cents and \$2.25 (10p-£1.40) for listing items for sale on its auction site.

VNUNET.COM

Short stories

MORE BUY ONLINE

Europeans are buying more online, with nearly four in 10 UK users making purchases on the web in the three months up to December.

An NOP study, sponsored by Hewlett-Packard, KPMG and VNU, revealed that of those 4,600 people polled in the UK, France and Germany, four in 10 used the net at least once a day.

Britain had the greatest proportion of web users at 31 per cent of over-14s. In terms of numbers, Germany came top with 19.1 million online, compared to 15.2 million Britons and 8.3 million French.



FRAGGING MARVELLOUS

UK-based Executive Software says its Diskeeper network defragmenter is still the only package of its kind to be Windows 2000 certified in both server and workstation versions.

Diskeeper 6.0 defragments a drive up to six times faster than rivals, including the utility built into Windows 2000. A 30-day trial version is available at www.execsoft-europe.com.

FAR OUT

A gizmo called rymicNet monitors fleet vehicles for potential faults and sends its data for remote analysis via depot web-access points. US developer Rymic Systems will add Bluetooth or 802.11 wireless Ethernet options this year which will allow data to be dumped automatically when a vehicle arrives. www.rymic.com

Feel your way round Windows!

Logitech has shipped a tactile mouse that allows you to feel your way round standard Windows programs. Force Feedback joysticks and mice have been available for some time for games but this is the first low-cost mass-market product for general use.

The new iFeel MouseMan costs £39.99 inc VAT, little more than a standard model, and Logitech believes it will help the ordinary user as well as poor-sighted people. After a couple of days of using it I would agree.

The mouse uses an optical sensor, doing away with the need for a scroll ball and leaving room for a small electric motor that imparts a

tiny kick to the mouse as it passes over icons, menu items, and window controls like Minimise and Close. It also reacts to hyperlinks in Explorer, though curiously not within Word.

Logitech says the mouse could be used to 'feel' pictures but developers would need to program it into their packages.

The mouse also marks when you get to the edge of windows to facilitate resizing — something particularly tricky for the poor-sighted as they need to be able to see when the cursor shape changes.

It has a scroll wheel and three buttons, one at the side for the thumb for right handers. All buttons can be

given a choice of functions and an ambidextrous model is also available.

It seems that the simple one-kick model could become very much more refined to allow screens to have 'virtual textures'. Laura Buckley, general manager of Logitech UK, said: 'In the real world we rely heavily on our sense of touch to orient and guide use. Why not use it to enhance our computing experience as well?'

Logitech 01753 870 900
www.logitech.com



FireWire bundles beat squeeze

Vendors are bundling FireWire (aka 1394) adaptors with video-editing software as only a minority of PCs are fitted with the fast serial port favoured by video camera manufacturers.

Intel has been accused of trying to squeeze FireWire out of the standard PC in favour of its own accelerated USB 2.0 port (see News, February). Some Far East vendors offer FireWire hard-wired to their motherboards with an eye on the growing home video market.

Intel may well follow suit, but in the meantime a FireWire upgrade can cost almost as much as a FireWire-equipped motherboard. Now PC-TV specialist Hauppauge is offering a FireWire package that it claims offers more

features for less than any other system on the market.

The £129.99 inc VAT DV Wizard Pro package includes a PCI FireWire adaptor and a special edition of Ulead MediaStudio 6.0 with basic capture and edit features, plus an audio editor 3D caption generator.

An Australian company, Swann Communications, has launched what it calls the

Swann FireWire Video Works – Pro DV Kit, for £175 inc VAT. This also packs a FireWire card, together with Ulead VideoStudio 4.0 and MainActor for Video editing and Kai's Photo Soap 2 for still image manipulation.

Both products are available at major computer outlets. www.hauppauge.co.uk
Swann 020 8964 9111
www.swann.com.au

Y2K bug halts trains in Norway

The Y2K bug finally hit Norway's train service on 1 January 2001 – one year behind schedule. The bug was discovered when none of Norway's 16 new airport expresses or 13 high-speed, long-distance Signatur trains would start – apparently because they did not recognise the last day of the year 2000.

Mobiles go peering into the future

Peer-to-peer (P2P) networking, as used by music 'sharing' services such as Napster, is being touted for a much wider role in the emerging world of mobile Internet access.

Intel's Pat Gelsinger, vice-president of the Intel architecture group, predicted last year that it would produce the same wave of innovation for the next generation of IT that the Mosaic browser, precursor to Explorer and Navigator, brought to the last.

Curiously Napster, easily the best-known application, is not pure P2P because it uses a server to link a user to a machine where a desired music track resides. The alternative Gnutella system dispenses with the server by using a system of message exchange. In both cases the effect is the same: to allow a community of peers to share resources. Every participating machine is, in effect, both client and server.

P2P was creeping into offices and homes almost unnoticed even before Napster hit the headlines,



Gelsinger: 'P2P is the biggest thing since Mosaic'

because it is used in the basic networking bundled with Windows. Server architectures have been favoured for larger systems because of security, management, performance and scalability issues.

A snag of server systems is that they tend to leave much valuable material locked up in desktop machines, accessible only by individual users, according to Bob Apollo, European vice-president of P2P specialist Endeavors Technology. 'Users must make a conscious effort to

put files on a server so that they can be used by others,' he said. By contrast files in public directories on a P2P system are available to all.

Apollo does not see P2P replacing the server model. He says it is useful in certain types of applications – particularly for ad hoc communities of users who fall outside the usual WAN structure and whose only link may be a WAP phone or wireless-enabled organiser.

P2P can also be used for extranets, allowing companies with standard internal networks to form ad hoc communities for trading.

Endeavors, recently bought by Cambridge-based Tadpole, has developed a suite of products under the

name Magi to facilitate P2P networking on a variety of devices, including WAP phones. It claims to be able to give Internet-enabled devices the power of a web server.

An open-source thin server MagiExpress 1.0 for Windows 98/2000 can be downloaded for free at www.magisoft.net or www.endtech.com. Java, Linux, and MacOS versions are in the pipeline, and an open programming interface allows the development of user interfaces for specific target devices.

Other Magi modules include enterprise-class infrastructure software, a utility for searching and indexing P2P communities, and a servlet for embedded systems.



MagiExpress 1.0 packs an Apache server to allow a Windows machine to form part of a P2P community

P2P is 'a web jam in the making'

Napster-style P2P applications will bring problems for service providers and users alike, a leading group of analysts has warned.

One in two users worldwide will be signing on to at least two P2P applications by next year, says a new report from the Gartner Group.

It describes P2P, putting aside 'all the legal and philosophical arguments about sharing copyrighted material', as a success for

users and a 'threat to planned Internet access'.

But it warns that neither public nor enterprise infrastructure planners took into account massive P2P file-sharing when allocating bandwidth for the next five years. Even first-generation P2P applications are straining the system.

Samples of Napster use over a three-week period indicated that more than 12,000 machines were peering at any given time, advertising more than two

million MP3 files occupying 8.25TB. This, says Gartner, constitutes a traffic jam in the making.

A single broadband user could easily download 1GB a day in the background while performing other tasks, but it is the pattern as well as the volume of traffic that can cause problems: capacity is provided on the basis of 'bursty' traffic that allows more users per pipe.

There could be a particular problem with ADSL, which assumes that download

traffic will be far greater than uploads. P2P machines act as servers, vastly increasing upstream traffic and risking jams at the local exchange.

Ironically, the problem could get worse as Napster goes legitimate: following its deal with music giant BMG the quality, which depends on the encoding, will rise. Entire albums encoded at reasonable quality can occupy just 30MB; but as average quality rises individual tracks could take up 10MB each.

PROCESSORS

A new micro-signal architecture could help DSP programming to go mainstream

MSA boosts Intel's mobile plans

A new 'micro-signal architecture' (MSA) will allow mainstream coders to meet the increasing demand for digital signal processing (DSP) programming, according to joint developers Intel and Analog Devices.

The communications boom and the growing importance of analog technology, like speech and writing recognition, is set to make the DSP market almost as big as that for standard data processors in the next five years. DSP is used to scrub noise from both analog and digital signals.

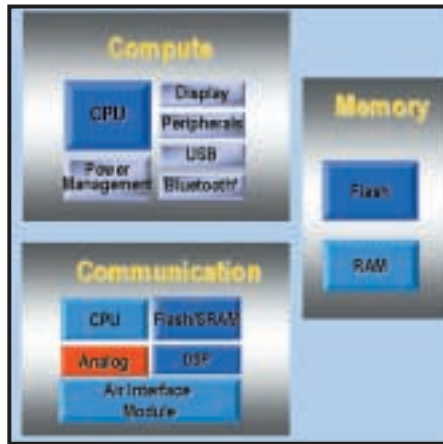
General-purpose DSP cores are generally used in conjunction with custom chips that are costly and tortuous to develop. Relatively few developers have the skills, partly because code produced by high-level languages has not been fast enough to keep up with the signal being processed.

MSA is the first DSP design to do away with the need for custom silicon, according to Willie Anderson, head of the joint development team. Instead the DSP core is

Intel's Personal Internet Client Architecture splits a device into three sections, each of which can evolve separately. The Compute section includes local connections including USB, which could encourage the use of thumb-sized memory modules shown by several vendors at Comdex – we're reviewing one next month. MSA would essentially replace all but the Air Interface section of the Comms module, providing a relatively simple programming interface. The air interface consists of chipsets for GSM or other wireless technologies

surrounded by a microcomputer that has been optimised for C/C++ code and takes advantage of increasing chip speeds to maintain realtime signal processing.

'MCA compilers are available for C or C++, languages that can account for up to 80 per cent of the coding,' Anderson said. This does imply that you have to dip into assembler but



match the power required by the task in hand.

Intel sees MSA as part of its drive to get onto the mobile communications bandwagon. Last September it published what it called a Personal Internet Client Architecture for connected mobile devices (see left).

Essentially this splits the client into computing, communications and memory modules. Intel marketing director Vish Deshamne said MSA fitted into the communications module, and provided a simple programming interface to link it to the other two.

This model also sees the MSA architecture working in tandem with a standard processor, in Intel's case its StrongArm-based XScale. But some tasks may not require a dedicated data processor, and a reduced DSP capability may be implemented for others.

Both Intel and Analog Devices will produce different MSA flavours targeted for different markets. Details of MSA can be found at www.dspjointdevelopment.com.

programmers do not have to mess with hardware and software stacks. 'MCA combines the speed of DSP with the simplicity of microcontrollers,' Anderson claimed.

Anderson also said that the initial 16bit MSA chips run at 300MHz but they will hit 1GHz within a year. They also boast advanced power management, switching voltage and frequency to

PROCESSORS

Moore's Law looks good for 10 years yet as gates get down to three atoms wide

Stand by for the 10GHz superchip

Intel has produced a transistor with an element just three atoms wide, indicating that miniaturisation can continue at its present rate for the next five to 10 years. It paves the way for 10GHz chips containing 400 million transistors operating at less than 1v – although manufacturing processes have yet to be worked out.

And it means Intel founder Gordon Moore's 'law', that transistor density will double every 18 months, could be valid for well over a decade longer than he predicted. He doubted it would hold good after the width of chip elements reached 0.25micron. That was achieved in 1997 and a 0.13micron generation is now emerging with a gate width of 0.07microns.

(Transistors are essentially a semiconductor sandwich that can be switched on or off by changing the voltage of

the 'filling', called the gate. The gate width is now less than the nominal width, which refers to the average width of other elements – see table below).

It had been feared that further shrinkage would cause leakage of electrons across the gate, making the transistor useless. The gate on the new micro-transistor is 0.03microns wide and consists of a layer of just two oxygen and one silicon atom, said Gerald Marcyk, director of Intel's Components Research Lab.

The technology could bring massive computing power to small devices such as watches and phones. It will also, according to Marcyk, enable applications such as high-quality 3D imaging, machines that respond to complex verbal commands, and realtime speech and language translation.

This assumes that brute

But will it happen?

Moore's Law seems to be on track if you compare the projected 400-million-transistor 1v 10GHz superchip with the latest 1.7v P4 (right), with 42 million



transistors, running at 1.5GHz. But Moore's Law involves a hidden financial assumption: that revenues from one chip generation will finance development of the next. It is by no means certain that demand for processing power will keep in step with technological advances. The P4 is having a shaky start (see page 25) and arguably entry-level PCs are already more powerful than current software needs. Of course, uses will be found for higher processing power. But with R&D and chip-fab costs in the billions, a hiccup in demand can have a major effect

computing power alone can overcome the problems of current recognition systems.

Power consumption is proportionate to the square of the operating voltage, so the sub-1v chips could be battery-friendly. However, the current density must rise to drive the huge increase in

transistors and there will be a trade-off, as there is now, between computing power and power drain.

The visible light used to litho-print today's chips will give way to Extreme Ultra-Violet light to achieve the resolution needed for the coming generations.

	1999	2001	2003	2005
Generation	0.18	0.13	0.1	0.07 microns
Gate	0.13	0.07	0.05	0.03 microns

Moore the merrier... roadmap for the amazing shrinking processor

Short stories

INTEL KEEPS AHEAD

Rival chipmakers failed last year to dent the lead of Intel, which grabbed 83 per cent of the market in terms of chips sold. AMD came in second at 16 per cent and VIA got a mere one per cent, according to figures from MicroDesign Resources. Transmeta failed to make any real impression.

Kevin Krewell, an analyst at MicroDesign, said that AMD timed the advent of Athlon well in late 1999, but Intel gained share with its Celerons, though AMD's Duron beat it on performance.

Krewell believes AMD is setting itself up for a fall by putting too many chips into the marketplace.

A BILLION FOR LINUX

IBM plans to invest \$1b (£670m) in Linux in 2001, chief executive Lou Gerstner announced. He predicted that fewer companies would offer proprietary operating systems as more buyers look to open-source platforms.

'I believe Sun... and Microsoft are running the last big proprietary plays we'll see in this industry for a long time to come,' he told a New York e-business convention.

vnet.com

WAP WAPPED

A study of 20 London users found them unenthusiastic about WAP data services using both Nokia and Ericsson phones.

Seven in 10 who tried the phones for a week said they would not use a WAP phone within the next year. They complained of the small screens, sluggish response and difficult navigation, said the study by the Nielsen Norman Group.

CDS GO FLOPPY

A flexible disc could halve the production cost of a standard CD, according to the developers Thin Disc Media. The Flexi CDs are also five times thinner than normal.

SCREENS

Organic flexible displays set to take root and grow

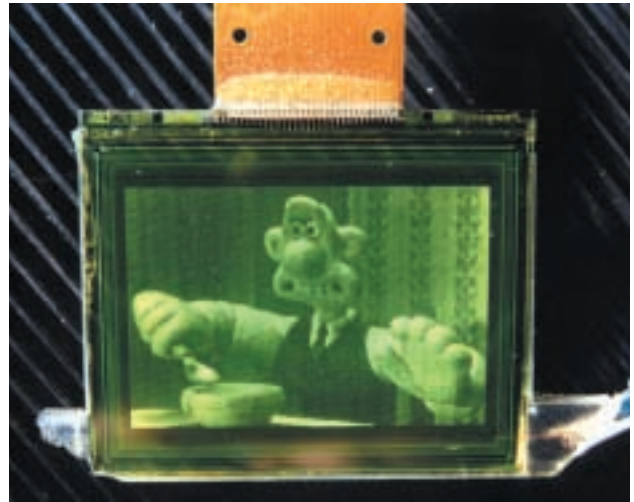
This year will see the first products using new 'organic' screens that are expected eventually to supersede liquid-crystal displays in mobile devices. Initially small versions will appear on devices such as mobile phones from the likes of Philips. But as soon as 2004, the technology could lead to larger, low-drain, colour screens that scroll away, or even fold to pocket size, says UK specialist Cambridge Display Technology (CDT). So devices as pocketable as the Palm could have screens the size of a notebook.

CDT (www.cdtltd.co.uk) is the pioneer one of the two leading technologies exploiting what are called 'Organic Light Emitting Diodes' (OLEDs). These are similar in principle to the LEDs used in status lights, except that they use carbon-based material rather than silicon semiconductors. They are inherently more efficient than liquid crystal, which blocks or unblocks light rather than emitting it.

CDT uses Light Emitting Polymers (LEPs), which are essentially plastic LEDs containing large carbon-chain molecules. US analysts have been talking up the prospects of a rival, older technology demonstrated by Kodak with smaller molecules.

But CDT CEO David Fyfe said that his company, in conjunction with Seiko-Epson, has made full-colour, active-matrix devices that are as good as Kodak's, but much easier to manufacture, particularly in large sizes.

'Small-molecule [screens] will continue to occupy niches in the long term, but the view we are hearing from outside is



Television from Seiko-Epson using a 21in organic screen from CDT with a resolution of 800 x 236 pixels

that if LEP continues to make progress at this rate, it will be more viable in the long term.'

LEP screens can be printed layer upon layer by an inkjet, while the Kodak method requires a more complex process of successive vacuum depositions through masks. It will also be harder to migrate from a glass substrate to the plastic required for flexible screens, said Fyfe. 'The small-molecules process involves heating... imagine what that will do to dimensional stability, when you need very high-accuracy emplacement of pixels,' he said.

CDT is investing nearly £18m in a production line in Cambridge. For the first year this will be used as a test bed both for CDT and its licensees. Later it will produce displays for niche applications.

The main problem with LEPs is that they degrade rapidly when exposed to water vapour. Although much used as a liquid container, compared to glass, plastic is quite permeable and is not suitable in its raw state as a sealant.

CDT is experimenting with several sealants that can be

used in conjunction with the plastic, says development strategy consultant Danny McGaughan, anxious to avoid the hype that surrounded CDT's launch, when there was much talk of the advent of 'electronic paper'.

'First the company has to get LEP working on glass and prove that the screens can be put into production', he said. 'The next step is to experiment with firm, shaped plastic screens for displays in cars or aircraft. Only then can the company move on to flexible screens.'

These bring a whole new range of problems. If the screens are flexible, everything inside them has to be flexible. So do the connections to the outside world, so we may have to look at redesigning every component.'

It will be hard, if not impossible, to get a screen to fold flat like paper. Every possibility is being examined – even hinged displays. But don't hold your breath for those flexible screens. 'I can't see it happening before 2004 at the earliest,' said McGaughan.

CLIVE AKASS

MOBILE

A new global language could isolate software giant, says Clive Akass

Microsoft out of SyncML

The specification of an XML dialect designed to allow devices of all types to exchange structured data has been published after a year in development. The SyncML project announced last year by Starfish, Psion, Ericsson and Nokia now has over 500 backers – with the notable exception, up to the time we went to press, of Microsoft.

SyncML should facilitate synchronisation of data not only between handhelds such as a Psion and a Windows desktop PC, but also between different makes of organisers.

Microsoft has embraced XML, which is related to HTML but includes metadata – data about data. Where HTML might throw contact details into the screen of a browser, XML will identify each component of the information so it can be fed into the relevant fields of a database record – or displayed in styles that can be predefined for a wide variety of devices.

This flexibility, at a time when the desktop PC is not the only device to go online, means XML is fast replacing HTML. Dialects like SyncML, and WAP's WML, tailor XML for a particular type of task.

XML is central to Microsoft's vaunted .Net

strategy for software development but, as SyncML shows, its platform independence spells danger.

Microsoft holds a big advantage in the handheld world as it can claim a tight correspondence between pocket and desktop versions of applications. How real

In SyncML ... the new Nokia 9210



this edge is, when other handheld makers offer synchronisation and file compatibility, is yet to be seen.

SyncML should level the playing field. A Microsoft application need only once be made SyncML savvy for any XML-smart device, soon to be virtually any connected device, to be able to talk to it – helping potential rivals to get working products quickly to market.

The Nokia Communicator 9210 is equipped with SyncML and the next version of Ericsson's R380 Smartphone will support it. Other backers include Lotus, Panasonic, IBM, Motorola and Palm.

David C Rudd, senior communications manager of Motorola's personal networks group, said Microsoft's input would be welcome but with 500 companies involved it already had momentum. He pointed out: 'Many of these companies already support synchronising to Microsoft-based products [and many] are focusing beyond the PC and the desktop to other classes of devices, services and applications where SyncML will be extremely valuable.'

If Microsoft doesn't follow suit it could find itself isolated – as would handhelds using its PocketPC operating system.

Magnetic RAM could prove to be big draw

A new form of non-volatile memory could give cellphones up to 1,000 hours' battery life and dramatically reduce PC boot-up times.

Magnetic random access memory (MRAM), being developed by IBM and Infineon, is expected in 2004. Using magnetic rather than electric charges to store data, it is said to combine the speed of SRAM, low cost of DRAM, and stability of Flash memory.

Dynamic memory needs refresh pulses to retain data – this is why phones and PDAs drain flat when not in use and PCs and notebooks cannot start instantly, even on models that remember their switch-off state: data is stored on disk as it would be lost in RAM.

Fred Zieber, an analyst with Pathfinder Research, said IBM and Infineon have rivals. 'The stakes are huge, with players like Micron, Intel, AMD and others... looking to MRAM in the future. The competition to bring this new technology to market will be fierce,' he said.

Zieber added that the Flash memory market will most likely feel the impact of MRAM before it affects DRAM.

JOHN GERALDS, SILICON VALLEY

Britain gets back to making cellphones

Britain can once again boast an indigenous mobile phone manufacturer with mass-market ambitions. Birmingham-based Sendō (www.sendo.com) was conceived in early 1999 and has just shipped its first product, the D800 – at 68g, supposedly the lightest GSM phone on the market (see also *Hands On PDAs & Mobiles*).

It is data enabled, has a

wireless IrDA port, supports picture messaging and boasts a 300-hour standby battery life. Sendō says it will break even by selling a little under 500,000 phones in its first year and its aim is more like 2 million. Virgin Mobile is one of several operators Sendō says it has signed up both here in the UK and abroad.

Customisation of the phone's appearance and on-

screen animated graphics to its customers' corporate identities is one of Sendō's trump cards. An ultra-compact WAP model is expected early this year.

Sendō is also working on Bluetooth, GPRS and UMTS products. It says its phones will be able to host any of the likely dominant operating systems like Symbian and Windows CE.

IAN BURLEY



Sendō's D800 weighs only 68g

INTERNET

Some search engines are giving paying clients a higher place in listings. Ian Burley reports

How to pay for a free lunch

The Internet seems to challenge the old adage that there is no such thing as a free lunch. Anyone can register their website with one of dozens of Internet search engines for no charge and users can find a site free, through keyword searches. So, what's the catch?

As recent headlines have shown, Internet search engine and portal companies are finding the financial going a bit tough. The vast majority of their income has traditionally come from the banner advertising on the pages that contain your search results. But these are criticised by some as being poor value for advertisers.

Dixon Jones, managing director of recreational.com, a consultancy that specialises in optimising the visibility of commercial websites, explained: 'In the UK, banner ads can cost between £10 and £150 per 1,000 impressions. This cost is ludicrous when even with a good campaign only around two per cent of these ads will result in a click-through.'

What is the alternative? Ideally, your site would charge advertisers for click-throughs rather than impressions, but they need to generate enough click-throughs to make this viable. One way of doing this is to offer prize competitions, as used, for example, by [espotting.com](http://www.espotting.com). Another way is to place advertisers' sites higher within search results, as does [goto.com](http://www.goto.com).

[Goto.com](http://www.goto.com) results must relate to your parameters, but the company's clients will appear higher up the pecking order than other, possibly more relevant sites.

You can tell when this happens because a note of how much the client will be

billed – should you click on the link – is provided. The charge is in the region of 10p to 30p on average on the UK version of [goto.com](http://www.goto.com), but on the US site big-spending advertisers are happy to be charged several dollars.

search engines at least, a fee now ensures that some sites are guaranteed to appear higher up.

'Some people will feel hard done by because of this,' said Ulph; but she points out that the Internet is, in general, an

were putting off our users.' Baker says that Lycos has no plans to offer paid-for prioritisation and suggested that there would be concern that users would think of this strategy as being 'less than honest'.

Lycos and other conventional search engine companies do use other, slightly less contentious ad-based strategies. Lycos, for example, can match 'kitties' or 'key phrase integrated text insertions' to your search parameters. These are context-matched ad-links which appear above the main

search results list – an advert for sporting gear, for instance, if you search for a gym. Lycos also has an editorial panel to recommend selected websites, but this process is entirely independent of advertising.

Baker rejected any notions that banner advertising is

ineffective or has a limited life, and he concedes that banners and 'kitties' are not enough to rely on in the long term. 'Ultimately, users need a more useful click-through experience,' he said.

Optimising the service for users and persuading them to register their details and interests to help tailor the service to their needs are high on Baker's list of priorities.

So, the free Internet lunch remains on the menu, but now there's more choice, if you can afford it.

www.recreational.com
www.lycos.com
www.goto.com
www.espotting.com
www.forrester.com



Top: Esportting.com lures users to client sites with prize competitions
Right: Goto.com's paying clients are higher in listings



This creeping commercialism of once-free aspects of the Internet is worrying. But there is little evidence to suggest that general free access to search engines is threatened. Rebecca Ulph, a media analyst with Forrester Research, says there is no detectable trend to charge users – this would simply stop many from using search engines regularly.

On the other hand, Ulph agrees that the marvellously flat playing field enjoyed by website owners could be tilted in favour of those who can afford value-added visibility. In the past any 'Joe Bloggs' site could, if designed well and registered with the right search engines, have exactly the same chance of turning up at the top of a results list as a global corporate. But, with some

exception to the norm that sees an organisation with a bigger ad budget gaining the visibility advantage.

However, Ulph is not convinced that the model of value-added search engine services like that of [goto.com](http://www.goto.com), will necessarily dominate the big players such as Yahoo!, Lycos, Excite, and AltaVista. 'These companies primarily rely on banner advertising and we still see a 100 per cent growth in this sector this year,' explained Ulph.

Lycos project manager, Tom Baker, points out that you must listen to users' likes and dislikes. 'We used to have pop-up ads, but not any more. We found that these

WIRELESS

Clive Akass reports on the problems and perils of computerising human relations

Seeing infra-red about Bluetooth

Email can be a perilous business. Argument by snail mail is perforce carried on at a stately pace, with time to consider and reconsider. An angry letter scribbled in the middle of the night can look very different in the morning and may not make it to the postbox. An angry email not only gets sent before you have time for second thoughts, but may also be instantly copied to the boss, the boss's wife, the Prime Minister and the pope. If you are not careful you can find yourself at war.

There is a bigger problem than is often acknowledged. Technology changes the way we relate to each other but it cannot match the subtleties of tone and body language that help us navigate the stormy oceans of human intercourse... the lift of an eyebrow, or the slight turn of the head, that can serve perhaps as both a greeting and a signal that, sorry, you are not ready to talk.

The issue is relatively minor in email. Once you get used to the dynamics your worst problems are likely to be the online equivalent of street hustlers and bar-room bores. Instant messaging systems go further by bringing a virtual group into realtime contact, so you need status icons to indicate who is willing to talk. They are not easy to fine tune: how, for instance, do you signal politely that you are ready to speak to one friend but not to another?

All of which leads me to Bluetooth. Most of us have been seduced at some time by the dream of what has come to be called personal area networking. But what has emerged is very complex indeed, and hardly to be served by a simple radio link.



Wireless headset from JTDC (www.jtdc.co.jp)... a winner for Bluetooth. Other tasks are not so simple

Think of yourself going into a crowded room. Some people have their backs to you. Others are in a position to see you but are too busy to talk. Others might want to talk but you don't want to talk to them. Tiny body cues, most of which you are barely aware of, help you through what can be highly charged social decisions.

Give all the people in the room Bluetooth devices – probably more than one each – and you have machines talking to humans, humans talking to machines, and machines talking to machines. How on earth are you going to decide who or what is going to talk to whom or what and when? All using the same, narrow highly contended bandwidth.

Bear in mind that Bluetooth has a range of 10 metres, giving a footprint of more than 300 square metres in which there could easily be upwards of 500 people and 1,000 devices. Mike Wilson, head of Bluetooth specialist Red-M, points out that not everyone will speak at once. But to prevent devices polling each other you would need to

switch Bluetooth off altogether, which rather defeats the object.

HomeRF and 802.11b, rival wireless Ethernet implementations, both seem a better basis for doing this kind of thing (see News, February) and both will be competing, along with microwave ovens and sundry other devices, for the same airspace as Bluetooth. What ought to happen is that we work out the most efficient way of using the bandwidth available; what will happen is that the market will decide.

It seems that Bluetooth will win for simple tasks like replacing headset wires. Business-oriented 11Mbits/sec 802.11b wireless links may gather momentum enough to beat HomeRF into homes. But HomeRF, hitting 10 times the speed of Bluetooth and with eight voice channels, looks a very promising dark horse. Like Bluetooth it uses low-cost spread-spectrum, and anyone who gets in quick with a cheap module implementing both could scoop a huge market.

No radio link in itself gets round the problem of establishing complex ad hoc

connections in a crowd. Machine protocols will have to evolve. So will their human equivalent, etiquette: I suspect this will involve a balance between the use of radio and infra-red. You don't

go into a crowd and shout 'I'm here' to get one person's attention. You walk up to them, catch their eye, shake hands, and huddle a little for a measure of privacy. Infra-red links provide a precise analog: you have to be in line of sight, you have to catch the 'eye' of the target device, you handshake if the target accepts your approach, and the beam inhibits eavesdropping. No jammed airways. No tortuous protocols.

You may think that you will never use machines at this personal level. Yet most of us already relate to colleagues in the same room partly across a network. Red-M has shown how you can walk into a hotel and, using its Bluetooth server, get a room without talking to anyone.

This is not an altogether comfortable prospect. But then nor is that of walking down the road talking to thin air, yet we have almost got used to never being alone due to cellphones. Machines will get smarter and we will become more adept at using them. We are computerising human relations and we are going to have to get used to it.

THE YEAR AHEAD

Tim Bjarin looks into his crystal ball to predict what the top 12 trends for 2001 are likely to be

The PC becomes a home server

My phone always rings off the hook at this time of year as reporters from print, radio and TV media call me for my predictions for 2001. As one of the analysts who has covered and chronicled the PC industry from the very beginning, they know I have a good historical perspective. So, here are my top 12 predictions for the year ahead.

1 The PC is not dead – it is in transition. People will realise that it is destined to become an even more important tool in the home. An estimated 35 per cent of US users will employ high-speed connections by late 2001 – 20 per cent more than last year. This will allow applications to be drawn off the network. And with emerging video, 3D and other animation applications, it will push up demand for higher-speed processors and should boost consumer PC sales late in the year.

2 This will be the year that streaming media begins to gain mainstream acceptance, although images are still not true video quality.

3 The PC will increasingly take over the role of a server in the home, becoming the repository for a family's personal information and applications.

4 This will drive demand for bigger hard drives and will lead to DVD rewritable drives becoming standard on consumer PCs – especially as home editing of photos and video takes off.

5 Digital devices such as PDAs, set-top boxes, Internet terminals and web phones will become clients to the home PC server. Critical to this change will be Bluetooth, to allow devices to



Europeans have tended to get a little smug about the fact that their wireless infrastructure is better than that of the US. But powerful, albeit non-standard, wireless links are available in many cities allowing Americans to explore the possibilities. A company called Metricom has fitted this NatSemi Webpad with a Ricochet modem to use its 128Kbits/sec wireless web service in cities like New York

talk to each other, and synchronisation technology to reconcile the date each device holds.

6 We will see a rush of corporate sites adopting 802.11b wireless technology, which will emerge as a major standard. And if prices fall, due to increased vendor competition, it could also become standard in home networking. The promise of a jump from 10Mbits/sec to 30Mbits/sec speeds make this standard even more attractive.

7 Mobile phone/PDA combinations are not yet perfect, but go a long way towards providing a single device with multiple features that should get serious attention from early adopters. The new Kyocera QCP-6035 palm phone is a great product with a very readable screen, yet makes voice a critical part of the design. The Handspring

VisorPhone and other modules designed to work with Palm-based devices will also be popular. And since these devices also give users text-based Internet and email connections, they are on track to becoming a most indispensable business tool.

8 Wireless web links to laptops will gain ground in the US. Metricom's Ricochet modem is a big seller in areas where the company's proprietary 128Kbits/sec infrastructure has been installed (see picture above). Elsewhere in the US Sprint's CDMA-based modems will gain momentum.

9 Ultralite notebooks will become more popular. They have accounted for less than 10 per cent of laptop sales but powerful new versions with 12.1in screens could push this up to 25 per cent.

10 Windows 2000 will finally take off in corporates and drive sales of PC upgrades. Companies that resisted Windows 98 and stayed with Windows 95 will make the move to Windows 2000 in 2001. Also, expect Microsoft to pull out all the stops when it releases Whistler, the major new consumer OS, in the autumn.

11 The end of a free Internet is nigh. More websites that have free content and services will move towards a subscription model as they realise that basic web advertising alone will not make them profitable. Some material will stay free, but premium content will have charges attached. This is especially true for music and entertainment sites and will have a dramatic effect even on big players such as Yahoo, Excite and Lycos.

12 Demand for PCs in the US will remain weak through the first two quarters of 2001 as people wait to see how the economy fares with a new President and the rising price of oil, which is likely to remain high for the foreseeable future. But, if the economy stabilises and starts to pick up, demand should rise in the second half of the year.

So, I predict that, overall, PC sales in the US will be up on last year's by around 13-15 per cent in 2001. However, I expect demand to stay strong elsewhere, causing worldwide sales to be up about 17 per cent over 2000 figures, which I believe will come in at about 20 per cent over 1999. This represents a softening of demand for PCs in 2001 but still shows some healthy growth barring any major worldwide economic downturn.

Legacy-free PCs may go mainstream, but the early years still have a place in Gordon Laing's heart

Dinosaurs under threat



I've always liked to believe I'm a forward-thinking kind of guy, but as far as PCs are concerned, I think I'm turning into a bit of an old git. It's this whole backwards compatibility thing that lets you connect ancient peripherals of yesteryear to an

otherwise thoroughly modern PC – I love it. I love the fact my PC can enjoy a 133MHz FSB and the latest AGP graphics card, while still supporting my favourite dusty old AT keyboard, and a handful of obscure ISA cards.

Surely this level of backwards compatibility is what PCs are about, right? It's what's allowed them to evolve and survive while the proprietary home computers of the 1980s died out. Then again, much of the technology I still enjoy in my PC is getting on for 20 years old and, according to the industry as a whole, is hogging precious resources and turning my system into a slow and unreliable dinosaur. Watch out legacy PCs, it's time for a change.

According to Intel, legacy PCs use older technology for compatibility, despite the existence of technically superior modern alternatives. In a nutshell, a legacy-free PC eliminates all those nasty old technologies in favour of shiny new ones, allegedly improving overall performance and reliability in the process. People have been talking about legacy-free PCs for some time now, but 2001 looks like it'll be the year they'll turn from novelty concepts into mainstream reality.

So what exactly is missing from a legacy-free PC? In a word, the ISA bus. In the old days, ISA was used as the bus across which all PC traffic was transported – information from keyboards, networks and scanners would enter the PC, head onto the ISA bus, where they would then mix with traffic to and from the hard disk and graphics card. The only problem was that the 16bit ISA bus ran at just 8MHz, which was proving to be a bottleneck even with 486 processors. After a short battle with VESA and a couple of proprietary solutions, Intel came up with the new 32bit PCI bus standard, running at 33MHz, and gradually everything migrated onto it.

Today, USB, the hard disk controller, along with almost all internal cards communicate across the PCI bus. Bandwidth-hungry 3D graphics cards enjoy their own dedicated high-speed AGP bus, which makes PCI look slow. So should we really be

mourning the elimination of the creaky old ISA bus on legacy-free PCs?

To answer that question, take a peek around the back of your PC. Apart from onboard USB, Ethernet and audio, almost every other port still talks to the aging ISA bus – these include the PS/2, serial, parallel and games/MIDI ports. While I'm personally increasing the number of USB peripherals in my collection, I still have something connected to each and every one of these legacy ports. Funnily enough, it's the old nine-pin serial ports I could least do without, as I use one for syncing with my old (but in daily use) PDA, and the other to configure my obscure hi-fi system.

Supporters of legacy-free will suggest adaptors to ease the pain as you migrate all your devices to USB, but that's hardly the point and, cost and convenience aside, there's a more sinister problem. USB may be the closest we've had to a truly plug-and-play port, but is it really up to the job of handling every external peripheral on a legacy-free system?

The 12Mbits/sec bus bandwidth of USB 1.1 seems fast compared to conventional serial ports, but it's no match for EIDE, SCSI or FireWire interfaces, as anyone who's swapped from a SCSI to a USB scanner will testify. It's also wholly inadequate for handling hard drives or video

In a nutshell, a legacy-free PC eliminates all those NASTY OLD TECHNOLOGIES in favour of shiny new ones, allegedly improving performance

transfer. Simple you say, just slot in a SCSI or FireWire card and enjoy an alternative high-speed port. The only problem is that truly legacy-free PCs are not designed to be opened, and some don't even have expansion slots at all; those that do may be limited to just one PCI slot.

This troubles me and as much as I like the idea of a sealed-legacy-free PC for non-techie users, I simply can't recommend them until USB enjoys a suitable upgrade. For that you'll have to wait until later this year for the widespread adoption of USB 2.0, boasting 480Mbits/sec bandwidth. At that point, legacy-free really will make sense, although I just can't see myself abandoning all my old devices – don't worry lads, backwards compatibility still includes the early years at my place!

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Where has the old-fashioned printed manual gone? Barry Fox feels a campaign coming on...

Bring back printed manuals



I feel a campaign coming on. Or am I the only boring grinch who regrets the passing of printed instruction manuals?

A neatly bound, tightly indexed book can be read on the train and sits on the shelf for quick reference. You can't

take Help files or an Adobe Acrobat CD-ROM file away from the PC. Most modern software has so many features and options that if you don't read the manual you never know what it can do.

Recently, with disk storage getting so cheap, I decided to clear my office by scanning key clippings and business address cards and indexing them electronically.

I bought a Corex Cardscan to scan the business cards. It came with smart software that converts card images into searchable text, with a plain English manual that tells you how to do the job. I read the manual on the train and keep it on the shelf for reference and trying new tricks. Cardscan is now part of my life.

I also bought a top-of-the-range Hewlett-Packard scanner with autosheet feeder to get rid of the paper piles. The scanner came with a CD-ROM packed with exotic software, but no manual. To find out anything I had to print out around 500 looseleaf pages. Even then, there is no overview of how to do the basics, just a hotch-potch of unrelated detail. I've since heard from two others (a doctor and radio presenter) who, like me, are still putting off the evil weekend needed to make some sense of it all.

I asked why HP has gone down this route. Says Shabnum Rajput, HP's scanner marketing manager: 'This is a decision made a couple of years ago based on some focus groups we carried out.'

Focus groups are small parties of supposedly average consumers who are shown products and asked questions. Their replies are taped and analysed to help the company make products consumers like better. I'll bet HP didn't give the focus group a chance to compare the HP ROM mish-mash with the Corex kit and manual.

Pinnacle makes TV and video cards. I tried the PCTV Rave Teletext tuner. Again there was no printed manual, just a flimsy paper sheet that tells the proud purchaser to use Adobe Acrobat software on the PC and print out 218 pages of indexed book text from a CD-ROM. Windows autorun makes the PC try to load the software

before it prints the manual that tells us how to install the hardware. But installing the software before the tuner card generates error messages.

Pinnacle's product manager admitted she had not noticed there was no manual. Later Pinnacle admitted: 'The reason for not including a manual is to save costs.'

TDK kindly sent me the new Cyclone CD recorder drive that dubs discs at 12 times normal speed; that's a one-hour CD in five minutes. The next model will be 16-speed. Great. But Cyclone comes with only a short multi-language hardware manual and nothing for the Nero software. The Nero CD-ROM sleeve says: 'User manual is included on the CD in the form of an Acrobat document'. In fact there are around a dozen different files in Acrobat, Word and plain text. Some look like virtual copies of printed manuals, some are readme files and some are additional notes.

These are not Help files, they are manuals that TDK has decided not to print. There are at least 200 pages and there may well be more files that I haven't yet found because they are dotted through several directories.

Even finding these files is tricky for novices as the user has to bypass autorun and right-click to explore the disc.

The Nero software is stuffed full of fancy features that the virtual manuals explain in as much detail as you

Has anyone at TDK tried printing out 200-plus pages, FROM A GAGGLE of file sources, then drilling holes through the thick pile of paper?

want. Has anyone at TDK actually tried printing out 200-plus pages, from a gaggle of file sources, then drilling holes through the thick pile of paper to tidy it into a ring binder?

It is not hard to see why Microsoft's printed manuals get thinner for every new software version. The company sells real manuals for an arm and a leg.

Windows Me comes with one of the thinnest yet. But there's a twist. While failing to explain the puzzling differences between that and Windows 98 (like program file listing, finding and the disappearance of DOS start-up) the Me booklet finds time to tell novices how to do megaton bomb stuff like using Fdisk to wipe and partition the hard disk.

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Roger Gann provides some simple tips on protecting against malicious use of IT equipment

The devil within



I came across a bizarre and somewhat chilling tale recently, one that should make sobering reading for most IT and HR managers up and down the land – found on the rather excellent *Business Week* website

www.businessweek.com. The

story involved a disgruntled ex-employee who managed to bring down his ex-employer and put it out of business. Scary stuff, eh? Better than that, he walked away, scot-free – and all because the company didn't have a truly comprehensive employee code of conduct policy. So, before we start, hands up all those who don't have a formal code of conduct policy as regards the staff's use of the company's IT systems? Tsk, tsk, I thought so...

In September last year a disgruntled employee went 'postal' with his former employer's network, hacked in to it and allegedly sent emails to customers that contained 'strong words' and allegations that the company was moving into the web porn business. He further alleged

The ex-employee argued successfully that, due to a poorly-drafted CODE OF CONDUCT POLICY, his actions were in fact authorised

that one of the company's owners had been dipping into to the company's bank account.

The company's customer base took fright and 30 clients took their web hosting business elsewhere – putting a \$150,000 hole in the business' monthly cash flow. Shortly after, the company went belly up. Although an IT investigator tracked down and identified the 'perp', the company decided not to try to recover its losses from him through the courts since he had no means of paying.

It's an old IT security adage that the real hacking risk comes from within and not without – as many as three-quarters of security incidents originate from inside a company and not from a horde of juvenile third-world script kiddies with too much time on their hands. Most incidents relate to staffers harbouring some deep-seated grudge against their employer, seeking revenge by attacking IT systems – hitting where it really hurts. Few companies will prosecute as most fear the consequences of negative publicity.

The success of such actions against ex-members of staff can falter because many companies, particularly SMEs, have insufficient 'acceptable use' policies in place. An example of such a policy would be to forbid the downloading of any software (let alone porn!) from the Internet without the written permission of the IT department. Another might cover excessive personal use of email or web browsing. These are 'positive' restrictions – then there are the 'negative' dos and don'ts, such as 'no member of staff should try to circumvent any network security features'. And so on – fairly obvious basic stuff. Enforcement of such policies is difficult: it's one thing to impose restrictions but quite another to police them.

In the case of the web hosting company, the ex-employee, incredibly, argued successfully that, thanks to a poorly-drafted code of conduct policy that remained in force after his dismissal, his actions were in fact authorised. The company was thus unable to make its charges stick. So, for the want of care in drafting the policy, the man who caused the demise of the company escaped prosecution.

According to the *Business Week* story, where an employee is dismissed in acrimonious circumstances, 'a company's first legal action should be to get a temporary restraining order preventing the former employee from using internal security and other information'. This sounds provocative but such belligerence is easily justified if the

company and jobs of its other employees are threatened.

Mercifully, some companies do have acceptable use policies incorporated in their staff contracts and use them – the law firm at the heart of the recent salacious email affair, Norton Rose, had such a policy and so was able to discipline those members of staff who had forwarded 'that' email to the world and his wife. Had the glare of publicity not been shining so fiercely on that firm, it might have been more lenient.

Ultimately, this is a cultural rather than a technical problem – simply throwing money at it won't solve it. The best way to avoid such disasters is to plan ahead: devise a security policy and enforce it, configure your existing security hardware and software correctly and finally devise a code of conduct for staff that strictly defines how they can use the company's IT systems. This won't necessarily cost you anything but time and effort – but it might just save your company.

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What is this new email bill that allows spammers free rein? Nik Rawlinson does some digging

Spiced ham



'This message is sent in compliance of the new email bill section 301. Per Section 301, Paragraph (a)(2)(C) of S. 1618, further transmissions to you by the sender of this email will be stopped at no cost to you.'

How many times have we received spam justified by that opening paragraph? This example comes from a time-wasting message offering me a disc of no fewer than 8.5 million email addresses. No doubt my dot.com is one of them.

But what is this email bill, and why does it let people send me email that I have to pay to download whether I want it or not? I used to think this was just another example of the US wrongly assuming that it runs the Internet, passing laws that should not and cannot have any bearing over me. Then I did some digging.

You see, this all stemmed from the Commercial Email Bill, introduced to the US Congress in an attempt to regulate the transmission of unsolicited commercial

Never comply with 'remove' instructions as to do so only confirms your EMAIL ADDRESS IS LIVE and you'll be added to more mailing lists

email. Now to me that all sounds fine and upstanding, but it still only applies to the US, right? Wrong.

Actually, it applies to nobody, because although the 105th Congress passed the Commercial Email Bill, it was amended in September 1998 and this so-called Section 301, that justifies sending you unsolicited commercial email as long as removal instructions are included, was deleted from the statute. The entire Bill died at committee stage at the end of that year, but the following Congress saw the introduction of the Inbox Privacy Act, with much the same aims. Statisticians and those who know far better than I the effects of sending multiple emails at once, have warned against the enacting of the Bill, and the US House Telecommunications Committee advised that 'the Congress should decline to enact regulatory legislation with respect to unfair or intrusive practices on the Internet that the private sector can, given a sufficient opportunity, deter or prevent'. In other words, the Bill should be killed off.

The Spamhunters' Resource (www1.tmsinet.com/~strads/spamhunt/murk.html) foretells a bleak future for the Internet if such a Bill were to be passed. It would legalise the sending of unsolicited email so long as a 'remove' procedure was clearly stated. To quote the Resource: 'assuming 0.1 per cent of 10 million Internet businesses sends me one unsolicited advertising email per year, I will have to send out 274 'remove' requests every single day. Allowing one minute for each message for downloading and response time, it will take me 4.5 hours per day to send all the 'remove' requests, [over] half of a standard work day! It is unreasonable to believe I could properly send out all the necessary 'remove' requests, day in and day out. As a result, unwanted advertising email would continue to grow, flooding my email box and displacing desired communications, ultimately destroying email as a viable communications medium'.

So, assuming all references to Section 301 are legalese puff, what should you do? Never comply with 'remove' instructions, as to do so only confirms your email address is alive, and you'll be added to more mailing lists.

You could try complaining to the ISP through which the message was sent, but while that might get the spammer's account axed it's unlikely to get your address taken off their lists. A better option is to 'bounce' the message right back. Manually, this is not an easy thing to do, but there is a 271KB download that will help at www.pcworld.com/downloads/file_description.asp?fid=5402.

Fill in your details and the spammer will receive a convincing 'undeliverable message' email. This should be enough to have you removed from those lists that sell themselves on the basis of containing only working addresses.

Sadly, though, like grey British weather, spam is here to stay. No matter how hard we fight back we're each just one against the hundreds who want to sell us their email directory CD-ROMs. Even if one country does pass a law that prohibits unsolicited commercial email it will be unenforceable on an Internet-wide scale. Only when it becomes technically possible for recipient ISPs to identify the domains from which bulk email is sent and charge them on a sharply increasing scale for every 10, hundred or thousand messages dispatched, might we see some kind of redress. The originating ISPs will be forced to check and police their less responsible users more stringently, for the good of us all.

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letters

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THE CLICK GENERATION

In the review of the IBM Thinkpad A20P (November 2000, Reviews) Jason Jenkins says that one of his 'gripes' about this notebook is the lack of a Windows key, and so 'you are forced to move the pointer all the way to the bottom left...' I believe he belongs to what I call the 'click generation'. Doesn't he know that you can simulate it by pressing Ctrl & Esc?

MASSIMO PERONCELLI

STOLEN MOMENTS

Today I heard a great new song on the radio by Darude and decided to get it. I did not buy it but instead downloaded it from Napster. I then burned it onto a CD and played it on my portable CD player all day. I have no intention of buying the single. Why should I buy the track just for 'peace of mind'? I'm a poor student and

anything I can get for free, I'll take. Of course, I do feel a little guilty about stealing songs but for this I blame the record companies. They failed to embrace MP3 and instead charged ridiculous prices for tracks. In the past, Sony has tried to charge £4.50 per MP3 track. The Internet community now has a taste for free music and they'll never let it go.

NAME AND ADDRESS WITHHELD

NIK RAWLINSON replies >

In the eyes of the law this is copyright theft and by the same logic if you ever produce or invent something yourself and users of that invention decide that you are charging too much for it then they too will have the right to steal your creation. Would you still feel the same as you clearly do just now? The fact that you have asked for your name and address to be withheld only confirms that you are fully aware that what you are doing is theft.

NO SURFTIME ON ISDN

Your recent 'ADS-hell' letter writer (January 2000, Letters) is lucky at least to get Home Highway. I live in a large rural village, which has a population of 10,000 with a local exchange 1.5km from my house. Yet, I was told I was too far away, I know not what from, for Home Highway, but that I could have ISDN 2e.

I had two normal lines; the old original house line with the number I wanted to keep for normal use and the new line I wanted to use for the computer, but which would only connect at 28K. I did not realise that if I had a normal phone plus ISDN combination, I would be blocked from using Surfetime and my attempt to set up the service for my ISDN number gave the error message 'Surftime Error: Incompatible Installation. Unfortunately Surfetime is not available for multiple lines.'

When I rang BT's technical support, I was told that bandwidth was limited in exchanges and they had to give priority to emergency calls, and that people on Surfetime just left the line connected and blocked them.

It is all very well to worry about loads on exchanges, but BT is trying to have its



cake and eat it. It markets a service giving the impression of supplying all the bandwidth needs of Internet users, yet is giving a very different service in reality, and on an arbitrary basis. The fact of the matter is that in an area like mine, with no cable service, it is unlikely BT will make any effort to service its captive audience. I suspect ADSL will only be available far into the future in my location. I do not think I will even bother when it is.

MIKE DENNEHY

BT replies > *You have been advised correctly that the Surfetime discount cannot be applied to an ISDN installation. This option is only for single residential and business lines. Please accept our apologies for any inconvenience this may cause. I can assure you it is not BT's intention to mislead any of our customers, and this is why the list of excluded lines is included in the terms and conditions for the Surfetime discount rental on our website and all our Surfetime literature.*

However, I do know there are various Internet packages available for ISDN lines, and therefore I suggest you contact your ISP to find out more.

I hope this information is useful and clarifies the matter for you. If you should need any further assistance please do not hesitate to contact us via email to internet.support@bt.com.

LETTER OF THE MONTH

LONG LIVE FILM!

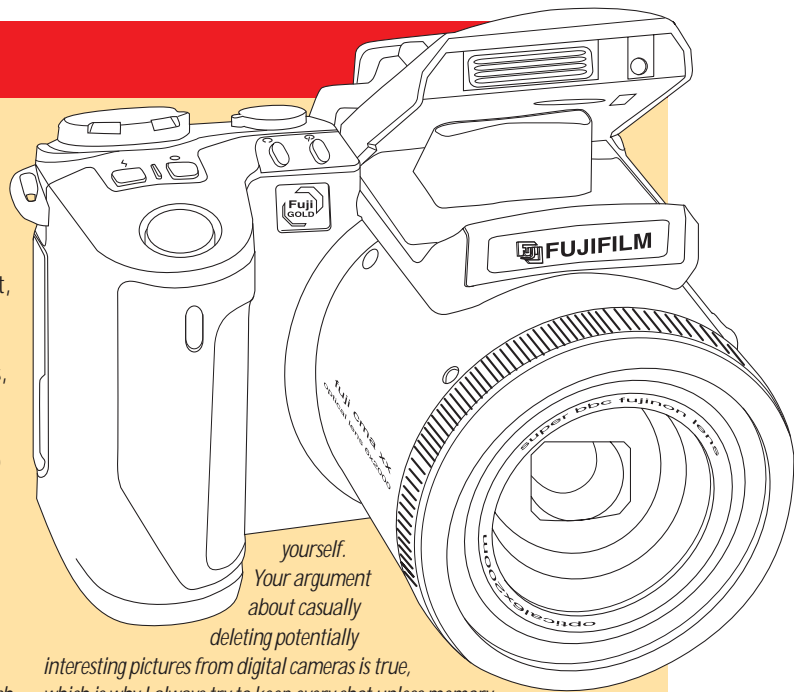
Recently I purchased a Black Widow FilmScan 2000 to scan some of my old black and white 35mm negatives from as long ago as 1958. I've since found that many pictures I discarded back then as being uninteresting or boring are fascinating. There were pictures of people and friends I had forgotten about, family members who are now deceased and places forgotten.

Watching these old negatives turning into positives on the computer is wonderful. If I'd had a digital camera in those days, anything uninteresting would have just been deleted and gone forever, which is why I have not bought one. You can be too cavalier with the delete button, and in years to come there is no forgotten record to be recovered, and of course if the ones you did like are lost when your PC decides to go belly up, all is lost for good. Therefore, my battle cry is Long Live Film.

BARRIE MARSHALL

GORDON LAING replies >

As regular readers of PCW know, I'm a huge believer in film. It's cheap and high quality, while the cameras themselves cost less than digital and enjoy much longer battery lives. Consequently, I'd only ever recommend going digital if you're someone who really benefits from having immediate image files, is happy with prints no larger than A4 and doesn't mind outputting them



*yourself.
Your argument
about casually
deleting potentially*

interesting pictures from digital cameras is true, which is why I always try to keep every shot unless memory really is tight. I would, however, argue that once your pictures are on your PC in digital format, they are potentially more secure than film or prints, which do fade over the years. Just make sure you back up those files!

PURPLE SCREEN BLUES

Mr Fleming's complaints about Gateway (Letters, November 2000) rang true for me. I bought my first all-new system from Gateway 18 months ago. From day one I had problems with the software, Megaphone, which caused the PC to freeze. Gateway's helpful hint was, 'Megaphone shouldn't do that.'

My Internet settings were repeatedly caused to stop functioning by a file in Winsock 2, which Gateway claimed was not its problem. My new machine was reduced to the role of a non-communicating desktop, the very opposite of my reason for purchasing it.

After three attempts at reformatting drive C, on the advice of Gateway, as the floppy disk was not working either, my entire database of Autocad and Photo-shop files was lost and my monitor screen began turning a bright purple.

One manager I dealt with left the company and apparently took any evidence with him. The Quality Assurance manager did not even bother to reply to my letter. One helpful chap from the technical department suggested I plug my monitor into another PC. Soon the warranty period on the monitor ran out and Gateway simply washed its hands of the entire affair and said: 'It is too late to do anything. Here is the address of the company we use to repair our monitors.'

Gateway makes claims regarding

customer care, which it simply has not provided. My monitor still turns purple and I can't afford another. What does Gateway say to that, I wonder?

STEVE PEARCE

GATEWAY replies >

We are extremely sorry that Mr Pearce's problems were not resolved in a timely manner. We have now discussed the matter with Mr Pearce and arranged to replace his original system with an upgraded model. We are committed to maintaining high standards of service and support for all our customers, and would like to stress that Mr Pearce's experience is exceptional and certainly not typical of our approach to customer care. Gateway has one of the PC industry's highest repurchase rates, and we know our customers keep coming back to us largely because of our emphasis on high-quality service and support.

WHAT ABOUT ARM CHIPS?

When I started reading *PCW* in 1978, all types of personal computers were covered, including many British machines such as the Tandy, the Archimedes A300 and the Archimedes RiscPC, which has since been upgraded to a StrongArm machine. Sadly, Acorn is no longer producing computers but several other manufacturers have started making machines using the Arm chips that I think are worthy of your attention. I hope that you will start reviewing them in the near future. I read *PCW* because I like to keep

up with what is going on in the world of computing, but I wish that you would broaden your horizons and look at the other types of machines that are available.

WC CUTLER

NIK RAWLINSON replies >

PCW has always been considered something of an 'umbrella' title, covering a far broader range of computers and related devices than its competition. Its commitment to focusing not only on the traditional PC was reinforced in January's issue when our cover carried no less than Sony's PlayStation 2 – something no other computer magazine would be brave enough to do. Unfortunately, though, space restrictions dictate that at times we are unable to cover everything we would like, and so it is not always possible to cover every machine on the market.

MICROSOFT V LINUX

The letter from Oliver Kroll (*PCW* January 2001) regarding Nik Rawlinson's review of Windows Me was clear, well thought out and very well put. The editorial reply from Nik Rawlinson, though, was so badly biased, distorted and frankly inappropriate that it reinforces rather than refutes Mr Kroll's point of view.

For example, Nik writes that: 'all reviews are approached from the viewpoint of an end user,' and that, 'some users may have been unable to work out the MSCONFIG fix.' However, some users even have problems locating the power

switch. Most PC users don't care about the internals of a computer system or its software – they simply want it to do the job properly straight out of the box. Software that needs detailed fixing like Windows Me installation is utterly unsuitable for this sort of user.

Nik also claimed: 'It would be unfair to rate it in relation to Linux or an alternative OS outside of a group test.' However, if you rate it only in relation to its predecessors you are not giving an objective rating. You are virtually carrying out an unpaid marketing exercise on behalf of Microsoft and that is not what any of us buy PCW for. An OS is an OS and should be judged against other OSs.

MARK A PRESTON

NIK RAWLINSON replies >

Microsoft bashing seems to be very fashionable at the moment. True, some less experienced users may find it difficult to get around the problem we had when first installing Me, but give those same users an empty hard drive and a copy of Linux and you'd soon see why Windows is more suited to the novice audience you defend. If you would like me to compare the ease of use of Windows Me with that of 'other OSs' – Linux in particular – I will, and before going into hiding for my own safety I'll reveal that it would score higher than the star rating awarded at the end of the review.

WATCH OUT FOR NET TAX

Kieron Cooke's letter (December 2000) invites explanation of the tax and duty situation resulting from overseas Internet purchases. I assume the price Kieron paid included local US State tax but no UK VAT, which if one purchases from the right state, brings an immediate price advantage. However, I would have expected UK import duty and/or VAT to be payable at the point of importation, as I have experienced with a non-Internet purchase. This would probably negate most of the pecuniary advantage of making the purchase in the US.

Apart from advice on having to be very wary of the ratings of any mains electricity powered devices, battery chargers included, and PAL TV standard compatibility where applicable, perhaps PCW would like to make all of its readers interested in ecommerce aware of the tax and duty commitments when making such an overseas purchase.

MIKE THOM

NIK RAWLINSON replies >

That's a good point well made. Even if you don't get collared for the tax upon delivery you may find a bill appears from Customs up to several months

later. Quite apart from this and any possible incompatibility issues, you should also consider that by buying overseas you'll probably also not have any kind of a warranty to fall back upon should the unthinkable happen.

STICKY STICKER SITUATION

I recently purchased a PC from Atlas. They regularly come top in your tests. I have now discovered that by opening the case [and thereby breaking the security seal], I have caused the warranty to be void. So the PC was guaranteed for a whole three days. Yet I purchased a three-year guarantee.

No PC I have had in the past has had such a clause. In fact Gateway's manual even encouraged users to open the box.

In future tests, could you give more details about the warranty, as the whole emphasis of PCs is on their expandability and adaptability?

This is not a complaint against Hi-Grade/Atlas. They have their rules, but it did not occur to me to ask what the guarantee actually meant, and I am sure service and support is a factor in deciding who to buy a PC from.

JOHN NORRIS

ATLAS replies >

I would like to reassure your reader that he has not invalidated the warranty. The stickers are put in place primarily to avoid any disputes over specification discrepancies. We understand that the label might be misleading and could have been more correctly labelled as 'Security seal', but we felt it was necessary for our customers to inform us of their intentions so our records are updated in order to give better support to them in the future.

We do not refuse to repair systems with broken seals under warranty, but if a problem occurs with a machine that is due to an after-sale upgrade by the user, the repair will not be covered by the warranty.

Thank you for your comments and they will be passed to our QA manager with my recommendation to change the wording 'Security seal'.

MISSING THE PDA POINT

With reference to David Parton's letter in the January 2001 edition, I also read your group test on PDAs with some interest, being a gadget techno freak, but I have to agree with David Parton in that I feel your test did miss the point.

I am currently using a Palm Vx because it's small, light, and does what I

want it to do. It gives me almost instantaneous access to my addresses, diary and to-do lists, without having to start up my notebook – or even carry it.

My previous PDA, a Jornada 420 did many new and, at the time, interesting things, I rarely used them and eventually, the size, speed and battery life consigned it to the scrapheap.

It is very simple. The Palm fulfils my needs. I think that it is Jalal Werfalli who has actually missed the point in his reply to David Parton's letter.

After all, a PDA is a personal digital assistant, not an MP3 player, a dictating machine or any other such tool.

With regard to the point in Jalal's reply about everyone having their own favourites, I take this on board. I have long felt that the way that group tests are done, each item being reviewed by a separate person, does not give the reader a balanced view. However, even if all items were reviewed by one person, bias would creep in. Maybe then, the reviewer should state up front which PDA they use, if any, so that the reader knows this when reading the review.

CALVIN CHANN

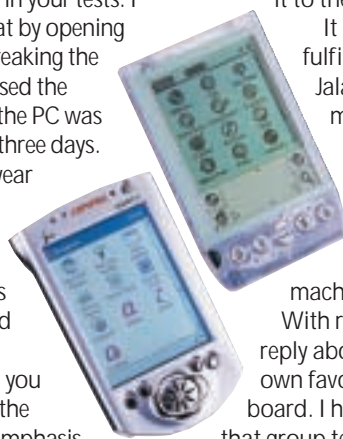
JALAL WERFALLI replies >

We were fully aware that an element of bias was unavoidable when the decision (for editorial reasons) was taken to split the PDAs among separate reviewers. Because of this, we felt that it would be more appropriate to stick with reviews that were geared toward the physical features that made each device unique.

These are usually the factors that have the most influence on the buyer's final decision, as you yourself experienced when opting for the smaller, lighter, quicker and extended battery life of Palm's Vx over HP's Jornada 420.

In contrast, when every device has the ability to remember your next dental appointment, it was inevitable that less emphasis was placed on contact and agenda setting functions. In addition, while we would acknowledge that quantitative testing such as sync times would be interesting, we wouldn't say that the ability to play MP3s or act as a dictating machine are features to be left out.

It is inevitable that some users become very attached to their own preferred choice of PDA, and PCW values feedback from its readers. We will obviously take on board some of the suggestions that have been made and, deadlines permitting, incorporate them into future PDA reviews in PCW.



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Jason Jenkins
REVIEWS EDITOR

The end of a graphics era

The demise of graphics card giant 3dfx is an astonishing end to a company that was once the envy of all. Staring bankruptcy in the face, the board of directors had little option but to recommend the sale of the majority of its assets to arch-rival nVidia. The deal is worth \$112m (around £70m): \$70m in cash and the rest in shares. Once 3dfx's shareholders approve the deal, the company will gradually dissolve.

How things change. It wasn't so long ago that 3dfx's cards were the de facto standard of 3D acceleration. The first two generations of Voodoo cards changed the face of 3D acceleration forever, and any game worth its salt had

the rights to the Voodoo brand, which has firmly established itself on the high street, and all of 3dfx's existing and under-development technology. nVidia now has rights to things such as the T-buffer, seen on Voodoo 5s, and, crucially, 3dfx's Gigapixel technology. This technique, which was under development, helps the PC to produce complex scenes faster by breaking each scene down into tiles. It is potentially another way to get graphics cards running faster, without simply designing faster processors and using faster memory, both of which are expensive to produce. An outstanding lawsuit between the two companies over alleged patent infringements will also disappear as a result of the deal.

It wasn't so long ago that 3dfx's cards were the de facto standard of 3D acceleration

to support 3dfx's proprietary GLide Application Program Interface (API). The cards also began the industry phenomenon that was eventually to cause the demise of the company: fast rollouts of new technology. This created an extremely cut-throat market, so that a graphics card company was only as successful as its current product: there has been no time to rest on past glories.

And that, essentially, is what killed 3dfx off: its products simply did not run as fast as the competition, and they weren't cheap enough to make up for it. It's true that the company also struggled to integrate STB Systems (which made the physical graphics cards) into its own operation (which was about supplying the chips that fit on the graphics cards), after the purchase of the company. But it was the failure of 3dfx to persuade PC builders to put Voodoos 3, 4 and 5 inside their new PCs that finished them, despite the fact that these products sold comparatively well in high-street stores.

It may seem strange that nVidia would want to buy 3dfx, but it will gain some commercial advantage in getting

What does this mean for consumers? It leaves only three major players in the 3D graphics card market: ATi, nVidia and Videologic. ATi and Videologic make their own cards, but many third-party manufacturers produce cards based on nVidia chips. However, they all bear a huge similarity to nVidia's reference design, and perform broadly similarly. The days when Elsa would sit down and refine nVidia's reference board design and drivers are gone: what matters now is getting products to market with the competition.

Fewer players in the market means less choice for consumers, although in this instance it is not necessarily a bad thing. Currently, all three companies produce excellent products that deliver the level of performance they were designed to – whatever product you buy, you'll be getting a decent board. Those who have purchased 3dfx products will have some support for a time at least, but the long-term situation is unclear at the time of writing. We can only hope that nVidia will decide to support the large numbers of people who have chosen the 3dfx path.

ratings

- ★★★★★ EXCELLENT
- ★★★★☆ VERY GOOD
- ★★★☆☆ AVERAGE
- ★★☆☆☆ BELOW AVERAGE
- ★☆☆☆☆ POOR

Mesh Matrix 850D

If you want a stunning PC with great specs and an unbelievable price, you've come to the right place

Mesh has built up a reputation for being at the cutting edge of AMD technology. It's usually one of the first companies to showcase the latest Athlon chips, but this time Mesh is showing off the more modest Duron. It's easy to forget about the Duron since the Athlon offers such an impressive price/performance ratio, but the Duron is a commendable chip in its own right.

The Duron has built a solid entry-level niche for itself at the expense of Intel's Celeron. Not only has the Duron proved to be faster than the Celeron, it's also cheaper. The performance gap is now closing with the latest 100MHz FSB Celerons, but the price differential is still evident.

Mesh has powered the 850D with the new 850MHz Duron chip, which is the fastest currently available. The Duron sits snugly in the Socket A connector on an Asus A7V motherboard sporting the VIA KT133 chipset, a Promise controller for UltraDMA100 support, and four EIDE connectors. The board has three DIMM sockets, one of which is filled with 128MB of PC133 SDRAM. As well as the standard two USB ports Asus supplies a further three that Mesh has mounted in an unused backing plate.

Filling the AGP slot is an nVidia GeForce2 MX graphics card with 32MB of SDR memory and TV-out capability. This may not be the fastest graphics card around but it will handle any 3D game you throw at it as well as keeping the system price keen.

Coupled with the graphics card is a Mitsubishi Diamond Plus 73 17in monitor. This display uses a Natural Flat aperture-grille tube that produces a bright and vibrant image. The OSD is fairly basic but all the important controls are there. Two of the five PCI slots are occupied, one with a 56K modem and the other with a SoundBlaster Live! 1024 sound card. The sound is pumped to a set of PC Works four-point surround speakers that will add realism to games.

The top 5.25in bay is filled with a 16-speed Pioneer DVD-ROM drive with a Teac CD-RW below it. You'll be able to watch DVD movies with the DVD-ROM drive and the TV-out port on the graphics card gives you the option of viewing them on your TV rather than the monitor. The CD-RW is a little slow by today's standards, only

with 2,165 3DMarks at 1,280 x 1,024 in 32bit colour, but the 850D is well up to playing the latest games. The Quake III score of 32fps at the same resolution and colour depth is also encouraging.

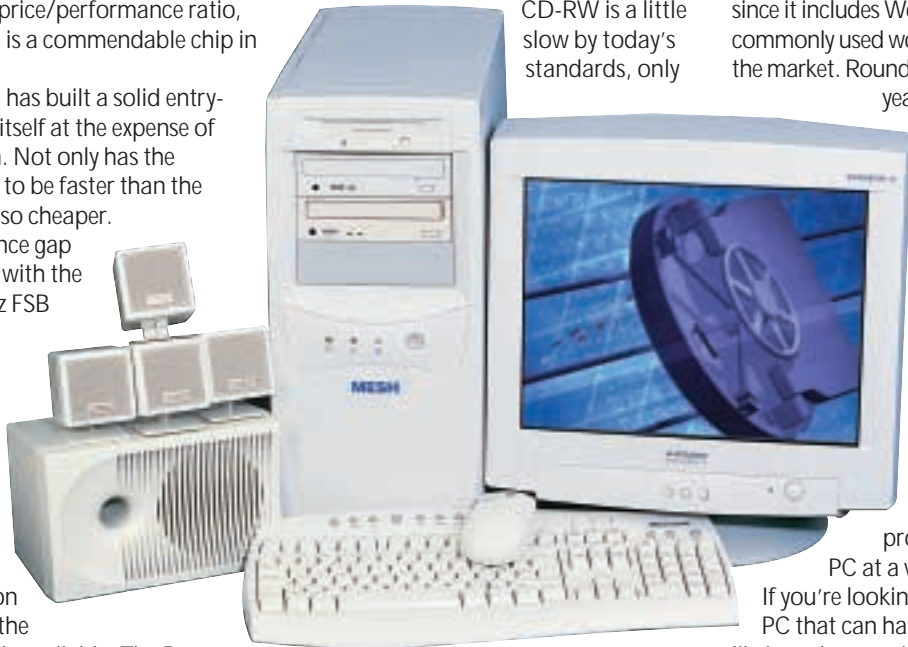
Windows Millennium is preinstalled and Microsoft Works Suite 2000 is bundled. This is a great-value office suite since it includes Word, the most commonly used word processor on the market. Rounding things off is a three-year parts and labour

warranty with the first year on-site.

If the specification and performance of the 850D seem impressive, these facts are even more amazing when you consider that the system only costs £883 ex VAT net including delivery.

Mesh has produced a well-specified PC at a very competitive price. If you're looking for a good-value PC that can handle anything you're likely to throw at it, check out the Matrix 850D.

RIYAD EMERAN



offering four-speed writing and rewriting but it's still a great addition at this price and gives you the option of transferring or archiving files. There's one 5.25in bay free for future upgrades.

Hard disk space is well taken care of with a 20GB Western Digital hard disk. If you manage to fill this up there's a spare internal 3.5in drive bay. Even the input devices are impressive with the Microsoft Internet keyboard sporting various extra hot keys for Internet and multimedia tasks. The Microsoft Intellimouse is as good as always, although we've been spoiled lately by the optical versions.

One area that often gets overlooked is the system case, but Mesh's case deserves a mention. Not only do you need no tools to gain access to the inside, but the internal layout is very clean, making it easy to perform upgrades. Mesh has also delivered an exemplary level of build quality inside the machine with no components obscured or hindered.

Performance-wise the 850D did well turning in a SYSmark score of 141. 3D performance was not earth shattering

DETAILS

★★★★★



PRICE £1,037.53 (£883 ex VAT)

CONTACT Mesh 020 8208 4607

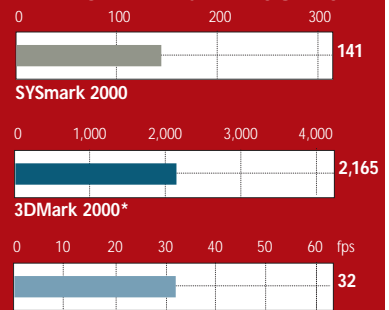
www.meshcomputers.com

PROS Excellent specification: great value

CONS None to speak of

OVERALL A stunning machine at an unbelievable price

PERFORMANCE RESULTS



* 3DMark 2000 and Quake III are tested at 1,280 x 1,024 32bit colour and textures

Time TFT Desktop PC

Stylish integrated system that's a good performer and offers lots of software to boot

Time's TFT Desktop PC is the latest in an ever-increasing range of integrated PCs to arrive in the PCW offices, and it is a fairly impressive piece of kit. The TFT Desktop is not made by Time itself, but by a Taiwanese company, and as other companies, such as AJP, have the rights to re-sell these PCs in the UK as well, you'll be seeing very similar systems appearing from them.

The TFT Desktop certainly looks more attractive than many of the similar machines that we have seen, and it has an extremely small footprint, even judged against other machines in its class. The centrepiece is a 15in LCD, with a native resolution of 1,024 x 768. LCD displays have increased in quality so much in the past year or so that it's rare for us to see a bad example, and there are no surprises here. The backlight is bright and even, so you'll have no trouble looking at the screen for extended periods. The shell is constructed from black and silver plastic with a small blue panel over the speakers in the front of the unit, and this gives it a very distinct look.

The spec is based on an Intel Pentium III processor speeding along at a reasonable 866MHz, 128MB of memory, and a motherboard based on a 630 chipset from SIS. The chipset is similar to Intel's 810 in that it features integrated graphics and is aimed at the budget end of the market. One advantage the SIS 630 chipset has over the 810 is that you can choose the amount of system memory that you allocate to the graphics subsystem, with 8, 16 and 32MB options.

The Time also has DVD and floppy drives that are mounted vertically on the right-hand side of the display. Both of these are slimline laptop drives. The SIS 630 chipset supports motion compensation, so when you play back DVD movies using the supplied software, part of the MPEG2 decoding load is

taken from the processor. On the left-hand side there are two Type II or one Type III PC Card slots, offering a wealth of expansion options. Contrast controls and audio in and out ports are located at the bottom of the display.

The rear is crammed with ports.

however, have a very large hard drive for a system in this class, a whopping 40GB from Seagate, mounted at the base of the unit.

It may seem churlish to complain about the keyboard and mouse, but we do think that it would have been better if the company had provided a more integrated solution, with multimedia keys, and styling to match the main unit. The system performed fairly well in our 2D benchmark, and we even managed to run both 3DMark and Quake III at 1,024 x 768 in 16bit colour, although at unplayable frame rates. It goes without saying that if you are thinking of buying this system to play games on – don't. It simply isn't intended for this, so it's not surprising that it can't deliver here.

Software is well catered for. In addition to Windows Millennium, you get Time's standard and executive software packs. These include programs such as Lotus SmartSuite Millennium, Works 2000, Norton AntiVirus and Encarta 2000.

This is certainly a step in the right direction for integrated PCs, and offers a fair compromise between performance, upgradability and size. There's a fairly hefty price tag attached to the TFT Desktop PC, though, and in our book this, combined with its greater expansion potential, leaves Acer with the award for best integrated PC.

LARS-GORAN NILSSON



There are two PS/2 ports for keyboard and mouse, two USB FireWire, parallel, serial and a VGA port for an external monitor.

Connectivity is covered by a 56K modem and a 10/100 Ethernet connection at the rear. There is even an infra-red port at the front of the system. In terms of ports, there's not much else we could have asked for.

Two issues always raise themselves when reviewing integrated PCs: upgradability and serviceability, and here, Acer's Veriton FP2 (reviewed last month) has the edge. Time's system is easy enough to open, but you're limited to upgrading the memory and the CPU. You can't replace or upgrade the LCD display in the same quick and easy way that you can with the Acer, so if the panel blows, you'll have a problem on your hands. It does,

DETAILS

★★★★★

PRICE £2,169.08 (£1,869 ex VAT)

CONTACT Time 0800 316 3407

www.timegroup.co.uk

PROS Stylish design; tiny footprint; good performance for its class; every connector you could ever need; lots of software

CONS Not as easy to service as Acer's equivalent; high price tag

OVERALL A stylish system that comes with just about everything that you could want from an integrated PC. With a few minor improvements it'll be a real winner

PERFORMANCE RESULTS

0 100 200 300

140

SYSmark 2000

Celeron vs Duron contest

Rivals Intel and AMD fight it out in the processor arena, as we put two Systemax PCs to the test

For some months now, Intel's Celeron has been looking fairly long in the tooth. Compared to AMD's budget equivalent, the Duron, the Celeron simply did not cut the mustard. The main problem with Celerons up to 766MHz is that they employ a 66MHz system bus. AMD's Duron uses the same EV6 bus seen in its Athlons, meaning the Duron sports a 200MHz system bus. This hampered the Celeron's performance substantially, to the point where a 750MHz Duron system we reviewed was 57 per cent faster at certain operations than a Celeron 766MHz. Unsurprisingly, Intel wasn't going to let this situation continue for ever – it was never a question of whether Intel would unlock the potential of the Celeron processor, but when.

The Celeron 800MHz is Intel's answer to its critics and, judging by our performance results, it's a pretty convincing answer. The only difference between this and a 766MHz Celeron is the all-important system bus, which has been increased to 100MHz. This is the same speed as some Pentium IIIs, of which you can buy 100MHz and 133MHz versions. It is produced using the same 0.18micron process used to make Pentium IIIs, and includes support for the same Streaming SIMD extensions that are part of Pentium IIIs. In fact, the only real remaining difference between the Celeron 800 and a Pentium III is the cache size. Both have 32KB of Level 1 cache, but the faster Pentium III sports 256KB of Level 2 cache, compared to the Celeron's 128KB. Contrast this with the Duron: this has the same 100MHz DDR (making 200MHz)

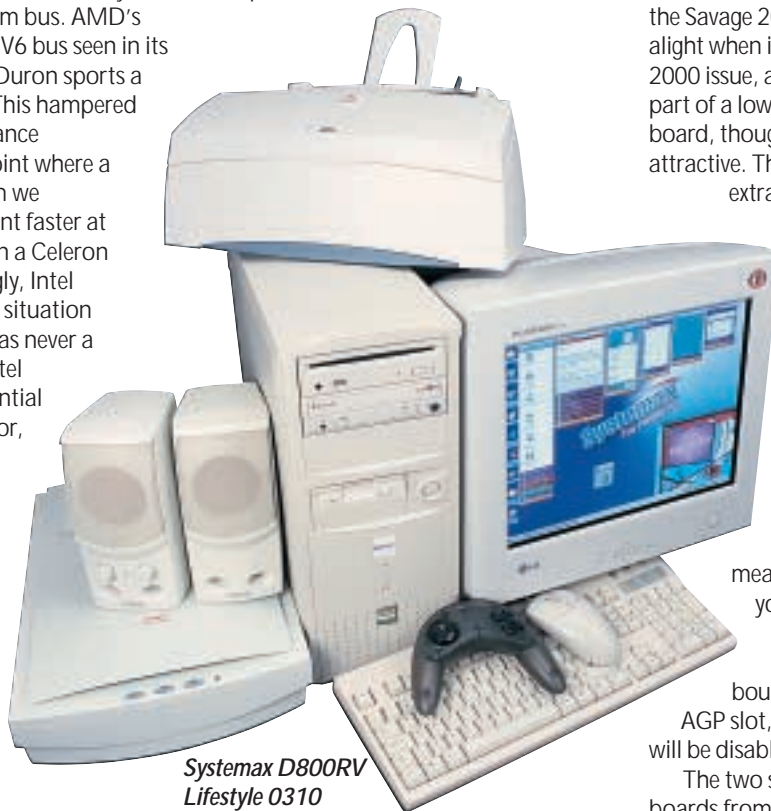
system bus it always had, 128KB of Level 1 cache and 64KB of Level 2.

Given this, it seemed like a good idea to pitch the Celeron against the Duron once again, so we asked Systemax to put together two identical (apart from the processor

chipset. The KM133 is intended for Duron and Athlon processors, and the PM133 for Celerons and Pentium IIIs. What VIA has essentially done is to integrate S3's Savage 2000 graphics chip with various components that already exist. Readers of *PCW* will remember that the Savage 2000 hardly set the world alight when it appeared in our March 2000 issue, as part of an AGP card. As part of a low-cost chip on a motherboard, though, it looks decidedly more attractive. There's no need for expensive extra memory, as there is on a graphics card, as a shared memory architecture can be employed. In contrast to the 815, you allocate the amount of system memory you want to be dedicated to graphics, up to a maximum of 32MB. The best part is that both chipsets support a separate AGP slot. This means, should you decide that you need faster 3D performance, all you have to do is place your newly bought graphics card into the AGP slot, and the onboard graphics will be disabled in favour of the new card.

The two systems use new motherboards from Biostar. At the time of writing, only the microATX versions of the two boards were available, but by the time you read this, Systemax will have the full-size ATX version, and this is what it will sell. The only difference between the micro and full ATX versions is the number of expansion slots – both use the same VIA chips, so performance should be unaffected. The Athlon/Duron board is called the M7VKF, and the Pentium III/Celeron board is the M6VSB. Both have four PCI slots, and a fifth is shared with an ISA slot – surprising, as so many companies are moving away from legacy ports such as ISA, but handy if you happen to have any legacy cards. One AMR slot sits above the AGP. Three DIMM slots cater for memory, and the chipsets support up to 1.5GB of memory. There's basic AC97 audio onboard as well.

The southbridge is the other important chip on these boards. Initially, it will be VIA's 686A, which offers support for the UltraDMA66 standard.



Systemax D800RV Lifestyle 0310

and motherboard) machines based on the two processors. It submitted a Duron 800MHz system, the D800RV Lifestyle 0310 and a Celeron 800MHz PC, the C800RV Lifestyle 0310.

Both of these systems use new integrated desktop chipsets from VIA, brought about as a result of a collaboration between S3 and VIA. The new chipsets feature onboard graphics. Called the ProSavage KM133 and ProSavage PM133, they are intended to compete with other integrated options from rivals, such as Intel's own 815

What's the difference?

	Celeron 800MHz	Duron 800MHz
System bus speed	100MHz	200MHz
Level 1 cache	32KB	128KB
Level 2 cache	128KB	64KB
Optimisations	Streaming SIMD	3D Now!

Systemax C800RV Lifestyle 0310



After VIA has sorted out the problems it currently has with its UltraDMA100-compliant chip, the 686B, this will be made available instead.

The nature of the two boards means there's no need for a load of extra cards, so the inside of the machines is fairly bare: only a PCI V.90 modem is present. Drive-wise, there's a slot-loading DVD drive, Pioneer's DVD-105. This is a 16-speed drive, so it'll be able to install any DVD software you have at lightning speed. A copy of Cyberlink's Power DVD is provided: the speed of both these processors means you should have no problems with dropped frames. Iomega is the supplier of the now ubiquitous CD-RW drive. This is an 8x 4x 32x unit – a real bargain considering the price of these machines.

There is 128MB of PC133 SDRAM all contained on a single stick. The hard drive is a pretty impressive model: a Maxtor DiamondMax Plus 45 53073H4. This 30.7GB drive spins at a speedy 7,200rpm, and is UltraDMA100 compliant. However, the southbridge only supports UltraDMA66, but this is a good addition nevertheless.

The monitor is a small departure for Systemax. Instead of the usual CTX screen we have become so used to, the

company has opted for LG's Flatron 775FT. Despite the switch, we've got no complaints. The 17in aperture-grille monitor can display up to 1,280 x 1,024, but only at 60Hz. A better choice would be 1,024 x 768, at which it can reach the dizzy heights of 85Hz.

Systemax has also managed to squeeze in a couple of decent extras. There's a Umax 2100u scanner, a 600dpi USB model with some handy one-touch buttons; and a Xerox Docuprint C8 printer. Neither would set the world alight in a standalone review, but they are a lot better than many other bundled units we see. Rounding the whole package off is a set of reasonably basic Creative SBS52 speakers. Software is well catered for – in addition to Windows Millennium, there's a copy of Lotus SmartSuite Millennium and six games.

As for performance, the Duron just beats the Celeron in SYSmark 2000, but by such a small margin it is too close to call. Things are reversed for 3D scores, but again by a very small margin. This demonstrates that Intel has finally caught up with AMD on the budget processor front. It also illustrates what has happened to processors over the past few months. As performance is much of a muchness, it really does not

make any difference any more if you choose AMD or Intel at this level.

As far as the 3D performance of the chipsets goes, it is nothing to write home about, as expected. You'll be able to get away with playing a few undemanding games at low resolution and detail settings, but for anything more you'll need to add a dedicated graphics card.

Both systems are excellent and would make ideal first-time PCs. Everything you need to get started has been included, and you won't be wasting money on flashy technology you won't use. Either would probably receive five stars if they were reviewed in isolation, but as they are in competition here, we should choose a winner. As performance is so standard across the two systems, the recommendation rests on price. Celerons are more expensive to buy than Durons, so the Intel system is £50 more expensive. On that basis, we have no hesitation in recommending the Duron system, the D800RV Lifestyle 0310.

JASON JENKINS

DETAILS

SYSTEMAX D800RV LIFESTYLE 0310

★★★★★

PRICE £1,056.33 (£899 ex VAT)

CONTACT Simply 08707 297 366

www.simply.co.uk

PROS £50 cheaper than the Celeron; slightly faster in SYSmark 2000

CONS You'll need a graphics card if you want to play games



SYSTEMAX C800RV LIFESTYLE 0310

★★★★★

PRICE £1,115.08 (£949 ex VAT)

CONTACT As above

PROS Slightly faster in 3DMark

CONS £50 more expensive than the Duron; you'll also need a graphics card to play games

OVERALL Both of these are ideal first-time PCs, and there's plenty of scope for upgrading

PERFORMANCE RESULTS

SYSmark 2000



3DMark 2000*



Quake III*



* 3DMark 2000 and Quake III are tested at 1,024 x 768 16bit colour and textures

Compaq Presario 1700

This stylish notebook has multiple software options for online purchasers

Notebook PCs have traditionally been seen as the preserve of the business user. Their high price has more often than not put them out of reach of consumer pockets. But Apple's success with the iBook in home and educational markets has awakened the interest of PC manufacturers in this area and Compaq's Presario 1700 is squarely aimed at the home user.

First there's the specification – 650MHz Celeron processor, 64MB of RAM, 10GB hard drive and Windows Me, 13.3in 1,024 x 768 TFT screen. Then there's the styling – two-tone silver and slate exterior with a shiny Compaq badge – stylish in a friendly, unimposing sort of way, but without a hint of frivolity. This is a home machine that you wouldn't be embarrassed to take to the office occasionally.

Then, of course, there are the buttons. The trend for additional keys to provide one-touch access to software applications has now spread to notebooks and you'd be forgiven for assuming the 1700 of the Compaq's moniker is a reference to the quantity of these.

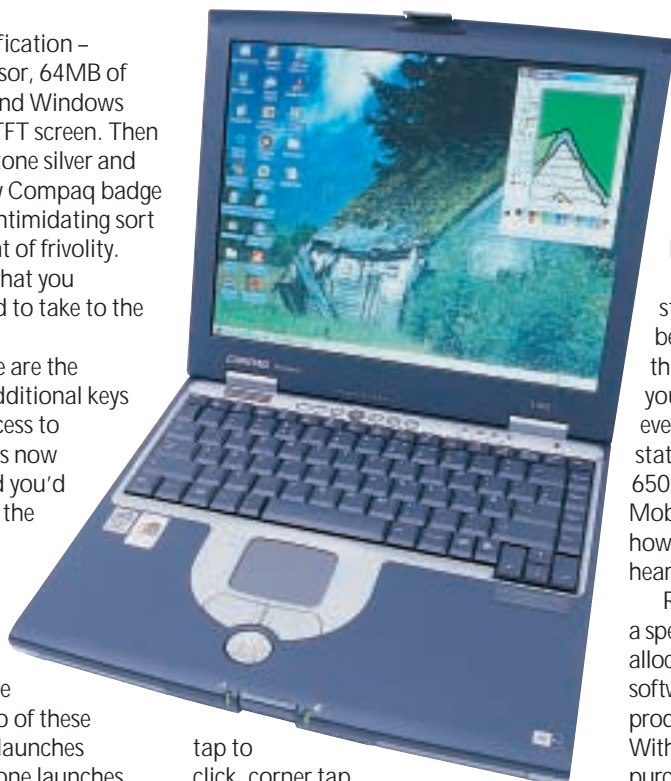
In fact there are only six actual buttons – three either side of the power button. Two of these control the volume, one launches Windows Media Player, one launches your email application and a further two launch your browser and connect to a specific site. The default ones are Compaq's Presario information site and notebook store, but they can be reconfigured.

The top row of the keyboard has 12 function keys and each of these also operates as an application launcher when used in conjunction with a function key on the bottom-left corner of the keypad. Four operate as cassette buttons for media player applications, four operate screen contrast and brightness (though there is no on-screen indication of settings), one is a sleep key, one toggles external monitor display settings, one is user programmable and the last is yet another Compaq web page.

The keyboard has a positive feel, though if you need to look at keys while you type, the bold white on dark grey letters might cause you eyestrain. Below

the keyboard is a very generous and comfortable wristpad area and this houses left and right mouse buttons as well as a disc pad that can be used to scroll the active window.

The Synaptics touchpad tabbed properties panel provides pretty comprehensive configuration including



tap to click, corner tap functions, touch sensitivity and edge motion – which keeps the cursor moving in the required direction when you reach the edge of the touchpad. You can even control this with finger pressure – increasing pressure on the touchpad to increase pointer speed.

A 'Palm Check' function helps eliminate accidental placing of the pointer while you're typing – a slider controls its sensitivity and it actually seems to work very well, preventing accidental repositioning, yet not interfering with genuine attempts to reposition the cursor, select text blocks and so on. In any event you can easily suppress taps from the touchpad icon menu in the system tray. The Synaptics panel also lets you reconfigure the disc pad so you can use it for web navigation or to play a keystroke macro.

Connectivity options include 56K modem, 10/100Mbps/sec Ethernet, two USB ports, S-Video out, a parallel printer

port and VGA socket. All of these are rear mounted and the last three are concealed behind a rubber flap. The Ethernet connection will be useful for those situations where you want to transfer work files, or for anyone running a home network. Unfortunately there's no IrDA port, so you'll have to look to other methods of wireless data transfer.

On the left panel there's a Type II PC Card slot, headphone and mic socket. Two bays on the right of the machine house the lithium-ion battery and a hot-swappable drive. The review model was fitted with a Panasonic CD-RW, and other options include a DVD, floppy and SuperDisk drives.

Two forward-facing JBL stereo speakers provide marginally better than average notebook sound, though if entertainment is your goal you'll need to resort to headphones or even invest in the optional docking station which has an S/PDIF socket. The 650MHz Celeron CPU and ATI Rage Mobility graphics accelerator are not, however, a combination that will set the hearts of game players racing.

Rather than shipping the machine with a specific software bundle, Compaq allocates points that you can use to buy software of your choice from a selection of productivity, reference and games titles. With the 10 points allocated to online purchasers you could, for example, put together a bundle including MGI Video-Wave III, Corel Print Office 2000, Norton Utilities, Norton Mobile Essentials, Quicken 2000 and Tomb Raider III.

KEN MCMAHON

DETAILS

★★★★★

PRICE £1,899 (£1,616 ex VAT)

CONTACT Compaq 0845 270 4000

www.compaq.com

PROS Build quality and styling; programmable buttons and versatile touchpad; software options

CONS Garish-looking keyboard; no IrDA; only 64MB of memory

OVERALL A contender to replace your home desktop PC

PERFORMANCE RESULTS



SYSmark 2000

Samsung NV5500 TL

A feature-packed slimline notebook that has a lot to offer the busy executive on the move

Catching the eye of a jaded executive is never easy for a notebook manufacturer, especially when everyone offers the same basic specifications and the same general look and feel. So Samsung garners its fair share of kudos by pushing the boat out, and trying to do something different with the NV5500 TL.

This is a notebook designed for the connected execs, those who spend their time moving from meeting to meeting and video-conferencing in between. We looked at a pre-production model, so the specifications may change slightly before the UK launch, but based on what we've seen here, Samsung won't need to change much.

Physically it's a blue and gold, slimline machine that's bound to attract stares. Together with the docking station, the whole unit is just 46mm high, which is not much larger than many full-size notebooks, and weighs 2.4kg. Detached from the base the NV5500 is just 22mm high and 1.38kg – so slim in fact, that the whole thing feels a little delicate. The keyboard is probably the most delicate part; it's practically flat and the keys have very little travel, which is a shame as it's reasonably well laid out. However, it should be fine as long as you don't hit it too hard.

The notebook has enough connectors and ports to get you by in most situations. Starting on the left-hand side, you'll find a modem port in the corner. Next to that is the power connector and a combined Ethernet or serial port. There are two cables supplied to plug in here, which gives you some flexibility, but of course you're a little limited if you need both connections at once. Next to this is a USB port, and a single Type II PC Card slot. The right side of the casing just holds the VGA-out port.

The rear of the notebook features a Kensington security lock, and is also

where the lithium-ion battery sits. At the front of the NV5500 there's a small speaker, a microphone port and a headphone port that's a little out of the ordinary; this is because it links to a supplied remote control for the onboard MP3 player. If you want to hear some tunes on the move there is 32MB of Flash memory onboard,



into which you can load MP3s or Windows Media files, and then play them back without the notebook's power even being on. Of course you're not really going to take this notebook jogging with you, however slim it might be, but conceivably you could listen to music on the move if you were carrying the NV5500 in a shoulder bag. More usefully for the mobile business user, you can record voice memos through the attached microphone that dangles on the remote control's cord.

The other gadget that comes with the NV5500 is ostensibly designed for business use, although some people will have more fun with it than that. It's a Samsung USB camera that comes with

an adjustable clamp that can attach it to the notebook screen's edge. There's some video-capture software included too, so within minutes of switching the NV5500 on we were able to shoot full-motion videos and capture stills. The software integrates with Microsoft NetMeeting, so video-conferencing should be easy enough as well, provided you have a decent connection.

However, getting connected should be easy with the docking station, which houses a 24-speed CD-ROM drive, floppy drive, and a few more ports including PS/2, PAL TV out, two more USBs, parallel and Ethernet. The speakers in the docking station are also considerably better than the single one in the notebook, which makes the combined unit a pretty good choice for presentations. With the 12.1in XGA TFT screen displaying a native resolution of 1,024 x 768, and the 8MB of S3 Savage graphics onboard, the pictures should look good too.

At the time of going to press the final specifications of the NV5500 weren't set, although in this unit there was 64MB of RAM, a 10GB hard disk and a 500MHz Pentium III. Combined you'd expect a fairly decent performance from the NV5500,

although we failed to get our benchmark test to run on it. Perhaps the best thing about this notebook in the end was the price. For a shade under £2,000 you're getting a lot of notebook for your money, with some nice extras thrown in.

STEPHEN REID

DETAILS

★★★★★

PRICE £1,999 (£1,701 ex VAT)

CONTACT Samsung 0800 521 652

www.samsungpc.com

PROS Feature packed; handy gadgets

CONS Poor keyboard

OVERALL A decent notebook that's low cost and low weight, with some impressive extras thrown in too

Gateway Solo 3350SE

This good-looking notebook is both small and light, but comes in a little pricey

There are obviously some notebook designers in the world who think that the original series of *Star Trek* was the epitome of space age elegance. They're the kind of people who'll feel happy when they pull out the bright silver Gateway Solo 3350SE in public and make like James T Kirk doing his Captain's Log.

Sartorial minus points aside though, the 3350SE is a credible attempt by Gateway to make some headway into the mobile executive laptop market. However the foundation that this notebook rests upon is a little shaky.

The 3350 is built around a mobile Pentium III 600MHz processor, backed up by 64MB of memory and a 6GB hard disk. On the software side it comes with Windows 98 SE and Works Suite 2000.

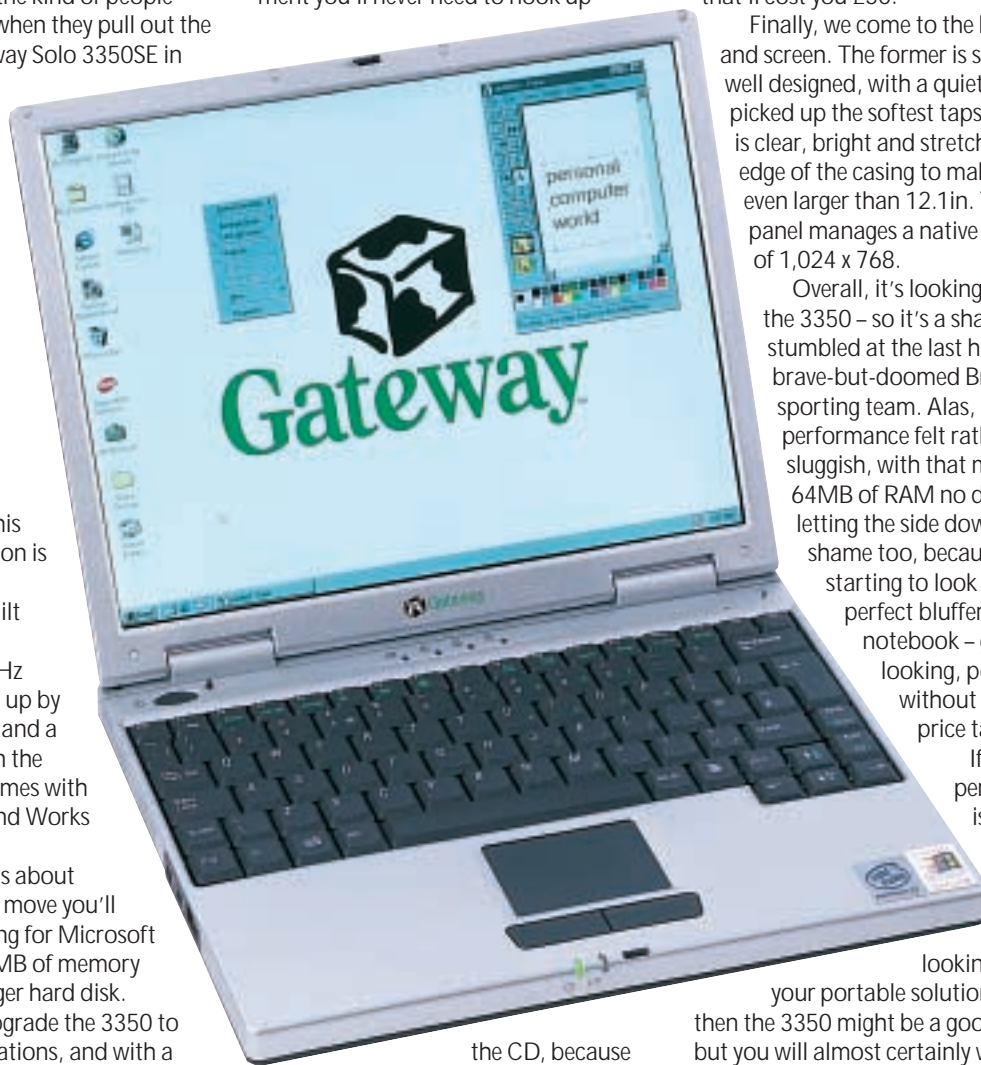
If you're serious about computing on the move you'll probably be looking for Microsoft Office 2000, 128MB of memory and perhaps a larger hard disk. Luckily you can upgrade the 3350 to just those specifications, and with a 10GB hard disk, 128MB of memory and Office Small Business Edition, the overall price rises to a rather steep £1,884 ex VAT.

So what exactly does the 3350 have that justifies the £500 difference between it and the 1150, also reviewed this month? It's very portable, but it also has all the expansion possibilities you could need if you're looking to this notebook as a desktop replacement. Shorter than a piece of A4 paper and about as wide, the unit weighs just 1.63kg, mostly because there aren't any peripheral components inside.

If you want to use a floppy drive or CD, then you need to connect up the supplied external bay. The floppy drive is standard issue, and the CD is a 24-speed

Panasonic drive, which should do just fine for installing apps or playing the odd music CD.

Luckily if you have a good IT department you'll never need to hook up



the CD, because the 3350 comes with plenty of connection options. At the rear you'll find a 3Com 10/100 Ethernet connection, a 56K V.90 modem port, plus VGA, parallel and PS/2 ports. Moving around to the right there is a single Type II PC Card slot, next to the hard disk – two Philips-head screws need to be removed to get at it. There's also a Kensington lock slot if you're particularly security conscious. Finally, on the left-hand side are the headphone and microphone ports, plus a single USB connector next to the cooling vents. Flip the 3350 over and access to the lithium-ion battery is simple, with just one catch to fiddle with. There's one of those handy status indicators too, so you can see how

much juice is left in it without booting up. If you're looking to extend the 3350's port possibilities you'll find a connector for an optional port replicator, although that'll cost you £50.

Finally, we come to the keyboard and screen. The former is small but well designed, with a quiet action that picked up the softest taps; the latter is clear, bright and stretches to the edge of the casing to make it seem even larger than 12.1in. The TFT panel manages a native resolution of 1,024 x 768.

Overall, it's looking good for the 3350 – so it's a shame that it stumbled at the last hurdle, like a brave-but-doomed British sporting team. Alas, in use the performance felt rather sluggish, with that meagre 64MB of RAM no doubt letting the side down. It's a shame too, because this was starting to look like the perfect bluffer's

notebook – good looking, portable but without too high a price tag.

If high performance isn't your priority and you're not

looking to tax your portable solution much, then the 3350 might be a good choice – but you will almost certainly want to upgrade to 128MB of memory. If you consider the fact that Hi-Grade can sell you its higher specified S8200-800 for less, then this Gateway starts to look less attractive.

STEPHEN REID

DETAILS

★★★★

PRICE £1,878.83 (£1,599 ex VAT)

CONTACT Gateway 0800 973 132

www.uk-gateway.com

PROS Small and light; good keyboard and screen

CONS 64MB of memory

OVERALL A decent enough ultra-portable, but it loses out on price and performance

Sony Transmeta Vaio

The Vaio C1 has slimmed and had a performance boost – one of the best just got better

Almost two years ago we reviewed the first Sony Vaio C1 'PictureBook', and it looked like Sony had another portable winner on its hands. The C1 may have been half the depth of a normal notebook, but the features were in no way cut down: the wide aspect ratio display operated at an impressive 1,024 x 480 pixels, a built-in camera could be used for snapping or video-conferencing, while both sides of the unit were packed with all manner of ports from USB to FireWire.

After several performance boosts and further slimming, the Vaio C1 has again returned, but this time there's no Intel inside. Instead, the new Vaio C1VE houses a Transmeta Crusoe CPU. While the Crusoe has been demonstrated in several notebooks at recent trade shows, the Sony Vaio C1VE is one of the first production models to be released with the new chip, and is the first we've had the chance to fully put through its paces.

Much has been written about Transmeta and its power-saving Crusoe processor, which claims to eek out every

Level 1 cache, but no Level 2 cache, while the TM5400 and TM5600 are available between 500 and 700MHz, have 128KB of Level 1 cache and 256 or 512KB of Level 2 cache, all on-die, respectively.

Along with Code-Morphing, the TM5400/5600 also boast Transmeta's LongRun technology, which like Intel's SpeedStep and AMD's PowerNow, allow these Crusoes to adjust both their internal frequency and voltage on the fly. Transmeta claims that LongRun can adjust itself much more dynamically than Intel's and AMD's mobile offerings, avoiding perceptible glitches.

In a nutshell, a Crusoe processor should enjoy longer battery life without overly compromising application performance. That's the theory anyway, so it's over to the new Sony C1 to see if it really makes a difference in practice.

The Vaio C1VE houses a Transmeta Crusoe TM5600 running at a top speed of 600MHz, backed up by 128MB of RAM (upgradeable to 192MB) and a 12GB hard disk. The NeoMagic graphics controller in earlier Vaios has been

supplies composite video and line audio to a TV set; there are also built-in stereo speakers and a microphone. Completing the picture are a single Type II PC Card slot, with support for CardBus and ZoomVideo, and immediately below, a dedicated Memory Stick slot, for Sony's own proprietary Flash card format.

In an attempt to eliminate old-fashioned 'legacy' ports, however, there's now sadly no infra-red on the C1VE. Sony correctly argues that eliminating legacy components and ports offers greater reliability and faster start-up times, but the absence of infra-red on a notebook before Bluetooth eventually finds itself fitted in all portables, is frankly unforgivable. Sony may have infuriatingly chosen not to fit infra-red to its mobile phones, but almost everyone else does, which means Nokia, Ericsson or Motorola owners, to name but three, will need to buy an additional cable or card to get their phone talking to the C1VE.

As an almost legacy-free device, you won't be surprised to discover the USB floppy drive has become an optional extra. There's also no CD-ROM drive as standard, so if you're intending to install anything, you'd better factor this into the overall cost. On the upside, Sony does now include a 56K PC Card modem as standard, although it might be better if this were integrated into the unit, thereby freeing up the PC Card slot when online.

Like all C1s, a built-in camera peers out from above the screen. Featuring a 1/6in progressive-scan VGA CCD, it can be used for snapping stills up to 640 x 480 pixels or grabbing 160 x 120pixel 10fps (frames per second) video clips, up to 30 minutes long; the live video capture window updates at 30fps and looks great. The camera can be rotated to face, or face away from the user. While handy for making short videos or taking quick snaps for emailing, the real killer application for the built-in camera is video-conferencing. With its built-in microphone, the C1VE has everything you need.

The unit itself measures a compact 248 x 27 x 152mm and weighs just 1kg with its standard battery. There's room to squeeze on 86 keys with a 17mm pitch that feel sufficiently good for sustained typing; a trackpoint is used to control the pointer. Sony has also fitted one of its Jog Dials on the right-hand side, which in

With built-in camera and microphone, you have all you need for video-conferencing

last minute from a notebook's battery. Unlike Intel and AMD that have effectively bolted on power-saving enhancements to existing x86 CPU designs, Transmeta has opted for a completely different strategy, designing its Crusoe CPUs from the ground up for low-power, mobile environments.

Rather than implementing an entire x86 processor in hardware, the Crusoe employs a simple VLIW (Very Long Instruction Word) engine, with an instruction set that bears no resemblance to the original x86 instruction set. A surrounding Code Morphing software layer actually takes x86 instructions from Windows or other x86 operating systems, and translates them into the native instruction set of the VLIW hardware. This approach eliminates the need for millions of transistors, producing a smaller, faster and less power-hungry core.

Transmeta has so far produced three Crusoe CPUs: the TM3200 is available between 333 and 400MHz, has 96KB of

dumped in favour of an ATi Rage Mobility 3D chipset, with 8MB of video memory. The display remains the same as earlier models: an absolutely gorgeous 8.95in TFT, which runs at 1,024 x 480 pixels in 24bit colour; an external monitor can be driven at up to 1,600 x 1,200 in 256 colours.

NeoMagic has also been retired on the audio front, in favour of a Yamaha mobile solution. Sony claims that this Yamaha audio chipset offers greater power-saving facilities than the old NeoMagic chip, but apart from that, it's entirely down to the Crusoe to make any difference to the overall lifespan – there's no new cunning backlight or even a higher-capacity battery compared to the previous C1XD model.

Connectivity-wise, there's still the full-size USB and mini-DV 400Mbps/sec i.LINK (FireWire) ports that grace most Sony notebooks, the latter for digitally connecting a DV camcorder. Joining these are an external monitor port, headphone jack and AV port that



conjunction with a neat utility window, can scroll through a list of options or applications and activate or launch them as required – it's also handy for scrolling through documents and web pages.

Sony has packed the C1VE with a wide range of utilities and configuration tools to operate all the gadgets, from the Jog Dial to the camera, including DV capture through the i.LINK port. Windows Me is installed as standard. The Crusoe CPU is configured by the LongRun utility that sits in the task tray. There's the option of LongRun optimised for either application performance or long life, or the choice of forcing the chip to run at the full 600MHz (1.6v) or its slowest 300MHz (1.3v) setting. In LongRun modes, it's interesting to watch the chip dynamically readjust itself from 300 to 600MHz in 100MHz increments as and when it needs to.

So how does it perform? First things first: with a score of just 50 in SYSmark 2000 (CPU at 600MHz, and display at 1,024 x 768), the C1VE can hardly be described as overly quick. The score means it completes the SYSmark 2000 scripts in twice the time of a desktop Pentium III 450 with 128MB of memory running Windows 98 SE.

Then again, not every notebook can be judged by its cover. The Crusoe's code-morphing technology should see it speed up in use as it caches repetitive tasks, such as a Photoshop filter or Word

macro. With this in mind, we tried running, say, the Photoshop or media-encoding portions of SYSmark 2000, up to 20 times in a row without restarting Windows to see if it got any quicker. Frustratingly the scores remained static.

We tried the same trick with Quake III Arena, but again observed no improvement across multiple timedemos; for the record, the C1VE scored 11.5fps at 640 x 480 in 16bit with full detail, and became reasonably playable if the quality was reduced.

The strange thing is that even though we couldn't benchmark the Crusoe doing its clever business, the C1VE genuinely felt faster in normal use than its benchmarks imply – certainly it felt more than adequate for general office and online tasks.

As for the battery life, Sony conservatively estimates 2.5 hours on average, which is only 30 minutes longer than the official time of the previous Vaio C1XD model, which used a 400MHz PII. In practice, however, we found the C1VE regularly lasting beyond three hours, including use of the PC Card modem, which is pretty impressive for a Windows notebook.

Despite disappointing-looking benchmark figures, this first outing for the Crusoe CPU is quite an impressive one. Sure, it doesn't extend battery life to that of a CE or EPOC-based unit, but

it lasts longer than other Windows notebooks we've tested, without particularly compromising

application performance. We also found no compatibility issues and look forward to testing other Crusoe notebooks soon.

As far as the Vaio C1VE is concerned, it was always a highly desirable sub-notebook to start with. With a Crusoe CPU, it now enjoys longer battery life while maintaining comparable application performance to the previous PII 400 model. Non-Sony mobile phone owners will be annoyed that there's now no infra-red, but apart from that, the best just got that bit better.

GORDON LAING

DETAILS

★★★★★



PRICE £1,499.99 (£1,276.59 ex VAT)

CONTACT Sony: 0990 424 424

www.vaio.sony-europe.com

PROS Relatively long battery life; tiny; gorgeous; feature-packed

CONS No infra-red and you'll need to buy a CD-ROM drive

OVERALL One of the best sub-notebooks just got better

PERFORMANCE RESULTS



SYSmark 2000

IBM i Series Thinkpad

From the i Series 1300 range, this notebook provides an excellent introduction to mobile computing

We first took a look at one of IBM's i Series Thinkpads back in the October issue, and were impressed with its build quality, configuration and its price. The model reviewed here forms part of the 1300 range of i Series Thinkpads.

This Thinkpad is certainly not filled with the latest components. But this is not what the i Series is about. IBM intends to target the lower end of the notebook market, hooking users such as new business professionals and individuals such as entrepreneurs and students.

Inside you'll find a mobile Celeron clocked at 600MHz supported by 64MB of memory. This can be increased to 192MB if you need more power, but in its current configuration it managed an overall score of 90 in our SYSmark 2000 test – not exactly lightning speed but enough for its intended usage. For storage there's a 10GB hard drive providing plenty of room for reports and assignments.

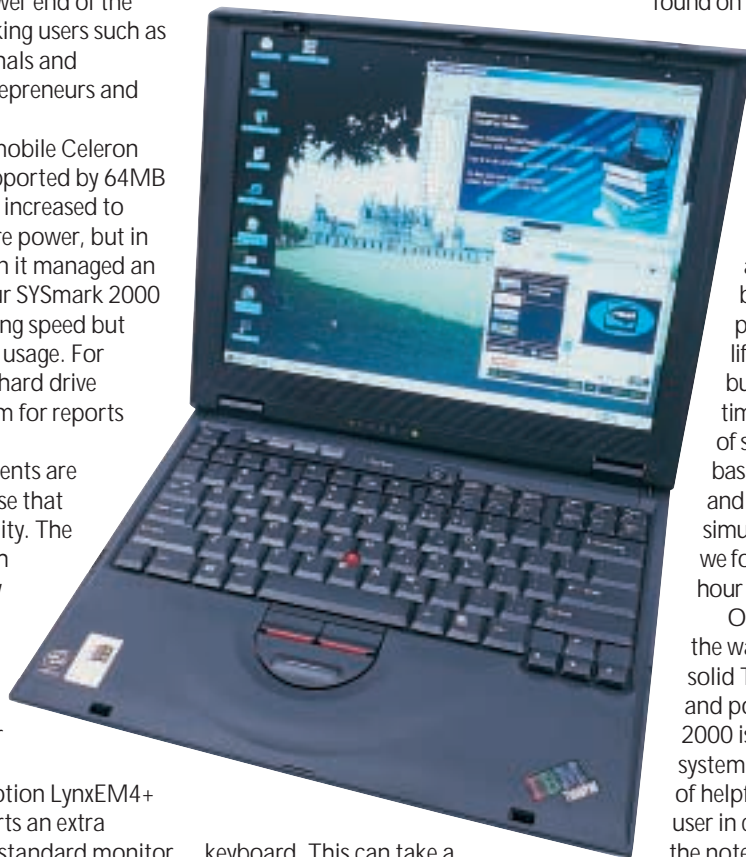
All of these components are enclosed in a rugged case that oozes robust build quality. The lid, for example, is much more robust than many we've seen on other notebooks, and is a virtue of the age-old angular design that IBM has stuck with over the years.

The 4MB Silicon Motion LynxEM4+ graphics controller sports an extra D-SUB port to which a standard monitor can be tethered for dual display output. It can display up to 1,280 x 1,024 on an external monitor. The 1,024 x 768 TFT is a shining example of a notebook screen. It is vibrant and can be viewed from quite a shallow angle. With 13.3in to play with, you'll have plenty of desktop real estate at your disposal.

As for the keyboard, it is what we have come to expect from IBM: it is well laid out with an intuitive distribution of responsive keys that feel lovely to press. The only gripe we had is with IBM's decision to reduce the size of the Return key, from the full-sized version we saw on the i Series 1200 notebook. Some keys also perform dual roles so you can adjust the brightness and contrast of the screen, and play CDs in the 24-speed CD-ROM drive. In addition, three IBM

Easy Launch keys above the keyboard provide instant access to the Internet and your email, so long as you're hooked up to it via the integrated 10/100 Ethernet or the 56K V.90 modem ports.

Pointer control is not via a touchpad that appears on so many of today's notebooks, but is instead controlled by the trackpoint in the centre of the



keyboard. This can take a little time to master fully but it does afford a precise way of moving the arrow around the screen. Beneath this, in addition to the standard selector buttons, is an additional button that, when pressed, allows you to scroll through pages with the trackpoint.

Positioned around the sides of the case are a variety of ports that deal with connectivity. Along with those mentioned earlier there are also two USB ports, a parallel port, headphone and microphone jacks, and one PS/2 for either a mouse or desktop keyboard. Two slots designed for either one Type III or two Type II PC Cards also join these. One point worth noting is the lack of an IrDA-compliant infra-red port, leaving those with IrDA-enabled devices stuck

without a means of wireless data transfer. Making use of one of the USB sockets is a 3.5in floppy disk drive that was supplied with our review machine. However, IBM's website quotes this as an optional extra, so be sure to check this before you part with any cash.

On the base of the Thinkpad you'll find the compartment that carries the same 9.6v nickel-metal hydride (Ni-MH) battery found on the i Series 1200 notebook.

This type is a little heavier than the popular lithium-ion (Li-ion) ones found on many notebooks, bringing the overall weight to 2.7kg. Ni-MH batteries also suffer from increased memory effect if they are not fully charged and discharged on a regular basis. In terms of battery performance, IBM quotes a life of two hours 36 minutes, but in our tests (using a self-timed looping macro made up of spreadsheet calculations, basic animation, saves to disk, and periods of non-activity to simulate natural human pauses), we found this to be closer to one hour 33 mins.

Overall we are impressed with the way that IBM has produced a solid Thinkpad, and to aid stability and power management, Windows 2000 is installed as the operating system of choice. There's also a range of helpful programs to aid the novice user in configuring and working with the notebook.

JALAL WERFALLI

DETAILS

★★★★★

PRICE £1,507.53 (£1,283 ex VAT)

CONTACT IBM 0870 010 2512

www.ibm.com

PROS Price; rugged design; good screen and keyboard; neat configuration

CONS No IrDA port; small return key; Ni-MH battery

OVERALL A solid introduction to mobile computing

PERFORMANCE RESULTS



SYSmark 2000

Rockdirect.com Pegasus

Small, lightweight and ideal for mobile applications, but make room in your budget for software

If first impressions count for anything, the Rock Pegasus PXS-600 makes a good one.

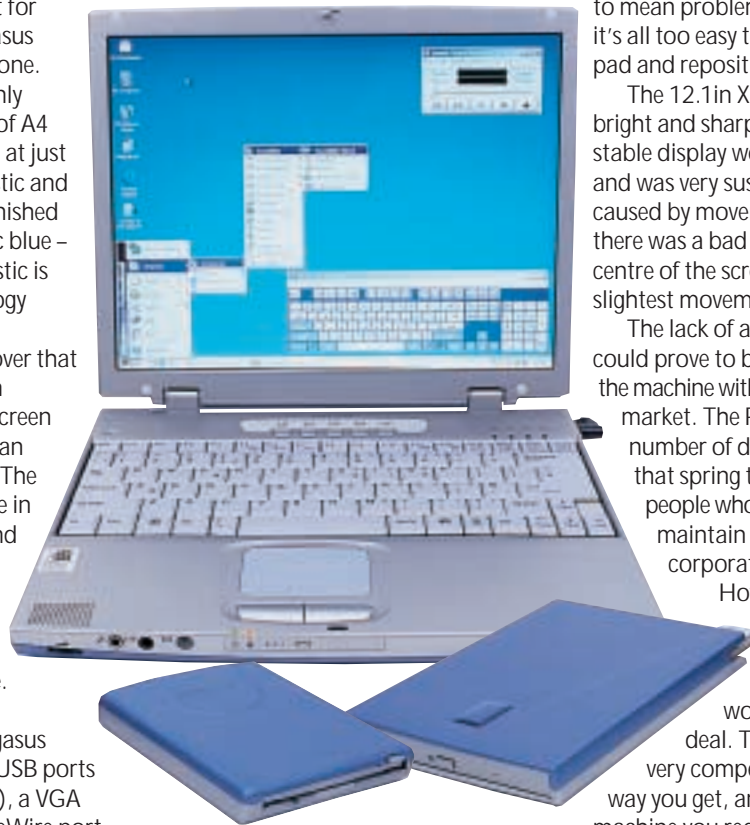
It's small, with a footprint only slightly shorter than a sheet of A4 paper; it's light – weighing in at just over 1.5kg, and the ABS plastic and magnesium alloy casing is finished in an attractive matt metallic blue – proving that translucent plastic is not the last word in technology designer chic.

Open it up and you discover that its good looks are more than superficial. The 12.1in TFT screen and keyboard are housed in an attractive matt silver casing. The touchpad and buttons reside in a generous wristpad area, and above the keyboard five quick-start buttons allow you to boot the machine and start your favourite application at the same time.

There's no shortage of connection options. The Pegasus includes no fewer than four USB ports (two standard and two mini), a VGA connector, an IEEE 1394 FireWire port, 56K modem port, S/PDIF audio out, mic, IR and 10/100 Ethernet.

If that's not enough for you there's an optional USB hub, or 'mini docking station' that provides three downstream USB ports, serial parallel interfaces and two PS/2 sockets for a keyboard and mouse. It's available for £69 ex VAT.

Additionally, there's a PC Card slot, and a dedicated connector for the eight-speed DVD-ROM that, in conjunction with the supplied software DVD player, produced smooth playback at sufficient



comfortably within the compartment, but provided only around one hour of life in our tests.

There is a further (£149 ex VAT) optional 12-cell battery which is considerably heavier (it weighs almost as much as the notebook itself) and extends rearwards by nearly an inch as well as downwards – raising the back of the machine and providing an angled slope to the keypad. Unless you very rarely work unplugged, the big battery is an optional extra you'll need to have.

to mean problems when keying in text as it's all too easy to inadvertently tap the pad and reposition the cursor.

The 12.1in XGA TFT, while clear, bright and sharp, was not the most stable display we've seen on a notebook and was very susceptible to distortion caused by movement. In particular there was a bad spot close to the centre of the screen that rippled at the slightest movement.

The lack of any bundled software could prove to be a drawback as it leaves the machine without an easily definable market. The Pegasus is well-suited to a number of different people. A couple that spring to mind are business people who want to travel light, but maintain office links, and mobile corporate video producers.

However, you'll need to factor in the cost of software that, with other manufacturers, would come as part of the deal. That said, the Pegasus is very competitively priced and this way you get, and pay for, exactly the machine you require.

In its basic unadorned configuration the Pegasus provides a powerful mobile platform with excellent connectivity options that would easily assume any of the roles described above. And if looks are important to you, the Pegasus is as stylish as anything we've seen lately from Sony or Apple. But looks or not, Rock will have to do something about that screen if it wants satisfied customers.

KEN MCMAHON

If looks are important to you, the Pegasus is as stylish as anything from Sony or Apple

quality for viewing on the 12.1in screen. The 600MHz Pentium III (there's also an 800MHz option), 128MB of memory and 15GB hard disk provide adequate power and storage for mobile video editing.

With the exception of the audio and mic sockets, all of the ports are arranged on either side of the machine, leaving the rear free to accommodate the four-cell lithium-ion battery. The supplied battery is long, slim and light and fits

The quick-start buttons can be easily assigned to any application and there's a dedicated button on the front panel that launches your email application and retrieves your messages.

The touchpad and button arrangement are comfortable and the touchpad can be used to click and drag by double tapping, but there is no way to turn this off or otherwise configure the touchpad. At the very least this is going

DETAILS

★★★★

PRICE £1,761.33 (£1,499 ex VAT)

CONTACT rockdirect.com 08709 90 90 90

www.rockdirect.com

PROS Small and lightweight; stylish; good connectivity options

CONS Battery life could be improved; display unstable when moved

OVERALL If you can find one with a stable screen it's an ideal platform for any number of mobile applications

PERFORMANCE RESULTS



SYSmark 2000

Gateway Solo 1150

A functional notebook for the budget user, but it has very little expansion potential

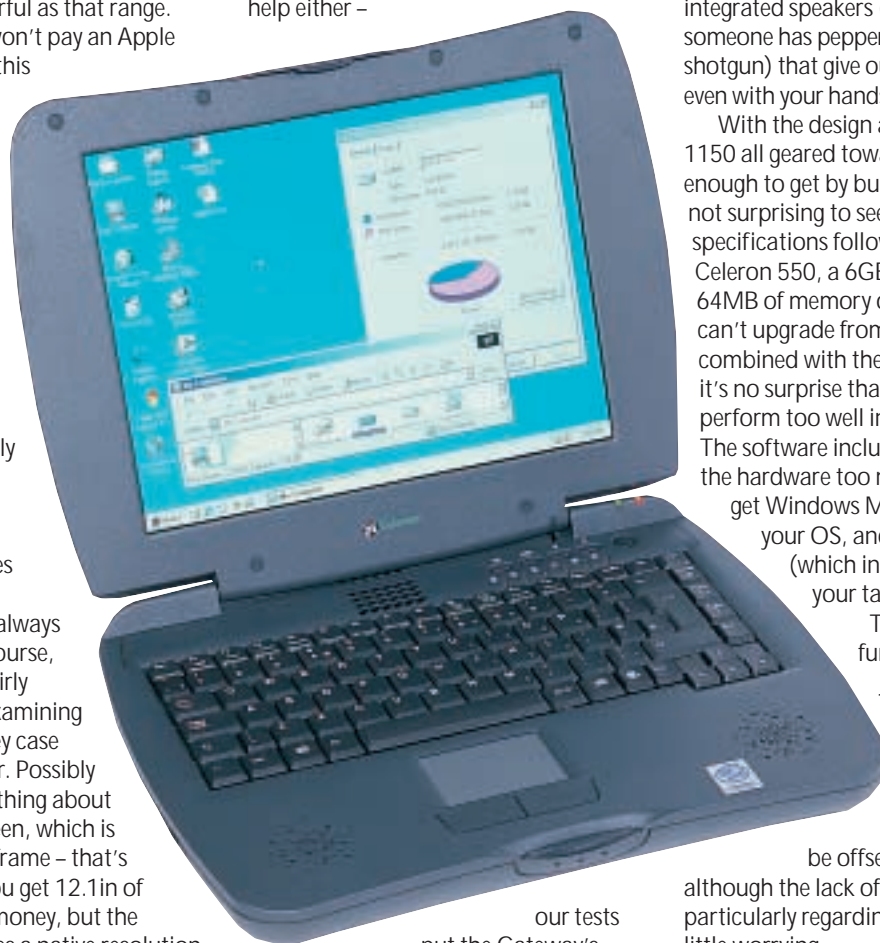
Gateway seems to have a definite retro theme running through its notebooks at the moment, and the Solo 1150 continues that. It reminds us of an Apple iBook, with its curves and sculpted edges, although it's not nearly as colourful as that range.

However, you won't pay an Apple price premium for this notebook as it costs under £1,000 ex VAT to get the 1150 in your hands, even if you might have some trouble holding up its 3.18kg bulk for long. This is the real bargain end of the notebook market, so inevitably it's not as flashy as some other models, but it still packs in the features nonetheless.

Cheap doesn't always mean cheerful of course, and we were in a fairly dour mood after examining the 1150's dark grey case and chunky exterior. Possibly the most worrying thing about the 1150 is the screen, which is set in a 'generous' frame – that's putting it kindly. You get 12.1in of TFT-LCD for your money, but the screen only manages a native resolution of 800 x 600 through the Silicon Motion Lynx3D chipset, which has 2MB of memory onboard. That's not too impressive, but with the wide frame surrounding the screen, it can feel like you're looking at a display that's even smaller than that.

A quick tour around the rest of the exterior showed the 1150 is distinctly lacking in ports and connections. Starting at the rear, which most notebooks pack with ports, you find a USB port, plus a badly needed external VGA socket, and the headphone and microphone ports. Moving around the rest of the 1150, we found another USB port and a 56K V.90 modem port on the right-hand side, plus space for a couple of Type II PC Cards on the left (or just one Type III if you prefer). As a 'legacy-free' device, this is not necessarily a

problem, but it is something to be aware of if you have any legacy devices. With both the floppy and CD drives integrated inside the 1150, it is fairly heavy, and the addition of a Ni-MH (nickel-metal hydride) battery doesn't help either –



our tests put the Gateway's battery life at one hour 27 minutes. One other effect of having this battery inside is that it will suffer from increased memory effect, making it less resilient than Li-ion (lithium-ion) equivalents. It does help to keep the cost down, though.

Sitting on top of all these integrated features is the 1150's keyboard, which in keeping with the style of the rest of the notebook is big, functional, but not too elegant. The big keys have plenty of travel, and are comfortable enough to type on. We'd prefer the layout to be improved slightly. Bearing in mind that this is a fully featured notebook, the Enter key is just a tad too narrow, the document navigation keys could have been better placed, and the backspace key is fiddly as well. As an added bonus, there are four programmable shortcut keys above the

keyboard, the first three of which are preset to launch your web browser, your default email and help. Below the keyboard you'll find a decent enough touchpad, a wide wrist rest to alleviate long-term typing problems, and a pair of integrated speakers (which look like someone has peppered the casing with a shotgun) that give out a beefy sound, even with your hands resting on them.

With the design and features of the 1150 all geared towards giving you just enough to get by but not much more, it's not surprising to see that the internal specifications follow suit. There's a Celeron 550, a 6GB hard disk, and 64MB of memory onboard. Sadly you can't upgrade from that figure, and combined with the Celeron processor it's no surprise that the 1150 didn't perform too well in our benchmarks. The software included won't stretch the hardware too much though; you get Windows Millennium Edition as your OS, and Works Suite 2000 (which includes Word) to do your tasks.

The Solo 1150 is functional and gets the job done, but without style or flashiness. Just about all of the problems we had with it could be offset by the low price, although the lack of expansion, particularly regarding memory, is a little worrying.

STEPHEN REID

DETAILS

★★★

PRICE £1,098.63 (£935 ex VAT)

CONTACT Gateway 0800 973 132

www.gw2k.co.uk

PROS Good software choice for this level of hardware; very reasonably priced

CONS Low-resolution screen; lacking in expansion options

OVERALL It might not have the best looks or performance, but the features are there and the 1150 is well priced for the budget user

PERFORMANCE RESULTS



SYSmark 2000

Fujitsu Stylistic LT C-500

Just the Tablet – a Windows-based solution for specialist vertical markets

Tablet PCs are the future – well, according to Bill Gates they are.

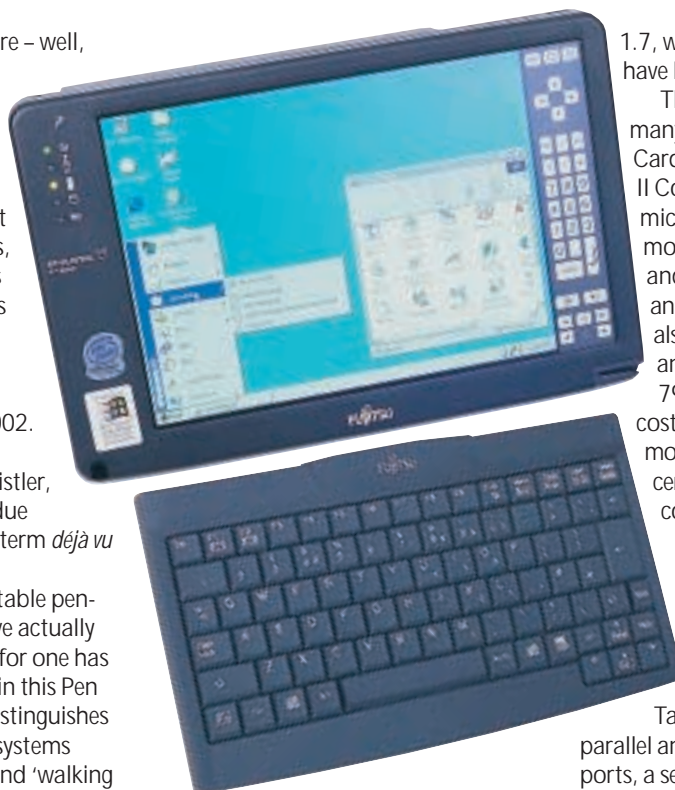
During his opening keynote speech at the annual Comdex show in Las Vegas last November, he enthused about a number of new technologies, but the one that everyone was talking about the next day was the Tablet PC.

Microsoft is developing a new OS for Tablet PCs, which is expected to arrive in mid-2002. Tablet PC extensions are also thought to be included in Whistler, the next version of Windows due later in 2001. But doesn't the term *déjà vu* spring to mind?

Tablet PCs, or at least portable pen-based computing devices, have actually been around for ages. Fujitsu for one has long pitched itself as a leader in this Pen Tablet market and carefully distinguishes between those with portable systems used in static environments, and 'walking workers' who literally use their systems while strolling around. Typical walking workers include those in Customer Relationship Management (CRM), sales force automation, service engineers, vehicle damage assessment, market surveying, along with utility companies whose daily work is laid on top of a map, such as electricity pylon inspectors.

As an established player in this market, Fujitsu has a number of different Pen Tablet products to suit every requirement and its three distinct ranges have all enjoyed recent upgrades. Its Pen Centra products are based on Windows CE, hence enjoying long battery life, and instant startup and shutdown times. The Stylistic 3400 is Fujitsu's flagship Pen Tablet, boasting performance to match that of a decent notebook. In the middle is the new Stylistic LT C-500, which succeeds the earlier Stylistic LT, and is tested here.

The LT C-500 is a smart-looking, resilient tablet, measuring 244 x 160 x 28mm (w x d x h) and weighing 1.15kg with its 3,100mAh (milliampere hour) battery pack; the battery thickens the Tablet at the top of the unit to 40mm. This makes it smaller than an average notebook and easy to carry around. Fujitsu claims a new built-in 'bridge-battery' allows warm-swapping of the main battery while on the move.



LT C-500 with optional IR keyboard

The unit is, of course, dominated by its screen, an 8.4in SVGA TFT operating at 800 x 600 pixels in 256 colours; an external monitor can be driven at up to 1,024 x 768 in 24bit colour via the optional Mini-Dock.

Down the right-hand side of the front surface are a number of keys for basic numeric input and navigation, but most of the control comes from the stylus and touch-sensitive screen. Fujitsu has used a liquid-filled digitiser surface, with 12bit resolution and an anti-reflective layer for better outdoor viewability. Obviously you should check it for your own requirements, but in our tests the display looked fine outside and is an improvement on the previous Stylistic LT model.

At the heart beats a low-voltage (1.35v) mobile 500MHz Intel Celeron, while storage is provided by a shock-mounted 6GB hard disk. The LT C-500 is available with either 64, 128 or 256MB of RAM, and the choice of Windows 98 or 2000. We tested the cheapest model, which came fitted with Windows 98 and 64MB of RAM, costing £2,363 ex VAT. The top of the range model comes with Windows 2000 and 256MB of RAM for £2,791 ex VAT. The Windows 98 versions come with Pen Services 2.0 and PenX

1.7, while Windows 2000 versions have PenX 2.0 installed.

The Tablet itself is adorned with many ports including one Type II CardBus PC Card socket, one Type II Compact Flash slot, USB, microphone, headphone, 56K modem, 4Mbits/sec Fast IrDA, and an additional infra-red port for an optional IR keyboard. The unit also features a built-in microphone and speaker. The optional 84-key 79 per cent pitch IR keyboard costs £82 ex VAT, and while not the most comfortable to use, is certainly a compact and attractive combination with the Tablet.

The most useful accessory, however, is the optional Mini-Dock, costing £148 ex VAT.

Acting as a convenient charging cradle and adjustable stand for the

Tablet, it also boasts serial, parallel and PS/2 keyboard and mouse ports, a second USB port, external monitor output, optional floppy drive connector and an RJ-45 Ethernet jack.

While the Stylistic LT C-500 is designed to be used on the move, it still makes quite a good desktop system in conjunction with the Mini-Dock. You could, of course, use a conventional PS/2 keyboard, but Fujitsu's tiny IR model, provides a compact, neat and wireless solution. Gates' vision of us wandering around homes and offices with Tablet PCs may happen in the future, but they currently address only very specialist vertical markets. If this includes you, you'll undoubtedly already be familiar with Fujitsu's products and welcome this new, improved model. As it's compatible with existing Stylistic LT accessories, the LT C-500 is also a great upgrade path.

GORDON LAING

DETAILS

★★★★

PRICE £2,776.53 (£2,363 ex VAT)

CONTACT Fujitsu 020 8573 4444

www.fujitsupc.com

PROS Many improvements over older Stylistic LT tablet, including better screen

CONS If you just want a pen-based organiser, consider a PDA instead

OVERALL Great Windows-based Tablet solution for specialist vertical markets

Pinnacle Studio DV plus

Editing with minimum effort – this reliable card gets some additional analog outputs

If you're a FireWire aficionado you're becoming spoilt for choice. Hardly a month goes by without a bunch of new FireWire scanners, hard drives or DV camcorders appearing on the market. Likewise, FireWire interface card manufacturers are looking to offer more than the standard two-port card that's been the norm until now.

Studio DV plus is an update of Pinnacle's popular and well-respected Studio DV, which consists of a FireWire card and video-capture and editing software. The plus is in the form of additional analog outputs on the card – composite video and S-Video sockets have been added alongside the two FireWire ports.

What use are these analog outputs? Well, if you have a camcorder with DV-in as well as out, none whatsoever. Those who own a DV-in camcorder will record their edited movies back onto DV tape and, if they want VHS copies to give to friends, they can make them by using the analog outputs on the camcorder.

But, as regular readers of *PCW* will be aware, DV-in camcorders have only recently begun to appear in Europe and, if your DV camcorder is more than a few months old it's odds-on that it's been nEUTered – had the DV-in port disabled to avoid the taxation the EC levies on imported VCRs (see this month's group test for a full explanation).

If you're in this unhappy situation the DV plus could be useful as completed movie projects have nowhere to go. Recording them onto VHS tapes is one way of getting them off your hard drive in a format that can be easily accessed.

Installing the DV plus was fairly straightforward, although the addendum to the manual was a little confused with respect to the drivers for the analog output. Like the Studio DV before it, this is a reliable card that functions well with hard drives and other devices, as well as camcorders. Pinnacle also offers a handy utility called DV switch that provides a simple means of swapping the Texas Instruments DV camcorder drivers for the Microsoft

ones which don't work with certain camcorders.

The Studio DV application is one of the simplest editing packages there is. The workspace is split into three tabbed panels for capture, editing and exporting movies. When you select the capture tab the program tests your hard drive to make sure it has enough space to

with full-resolution DV clips or in what it calls preview quality mode. Preview clips use much less disk space and allow you to work more quickly. When the project is completed the full-resolution clips are located and captured and the movie is rendered. For this to work successfully it's essential that your DV tapes have accurate uninterrupted timecode from beginning to end.

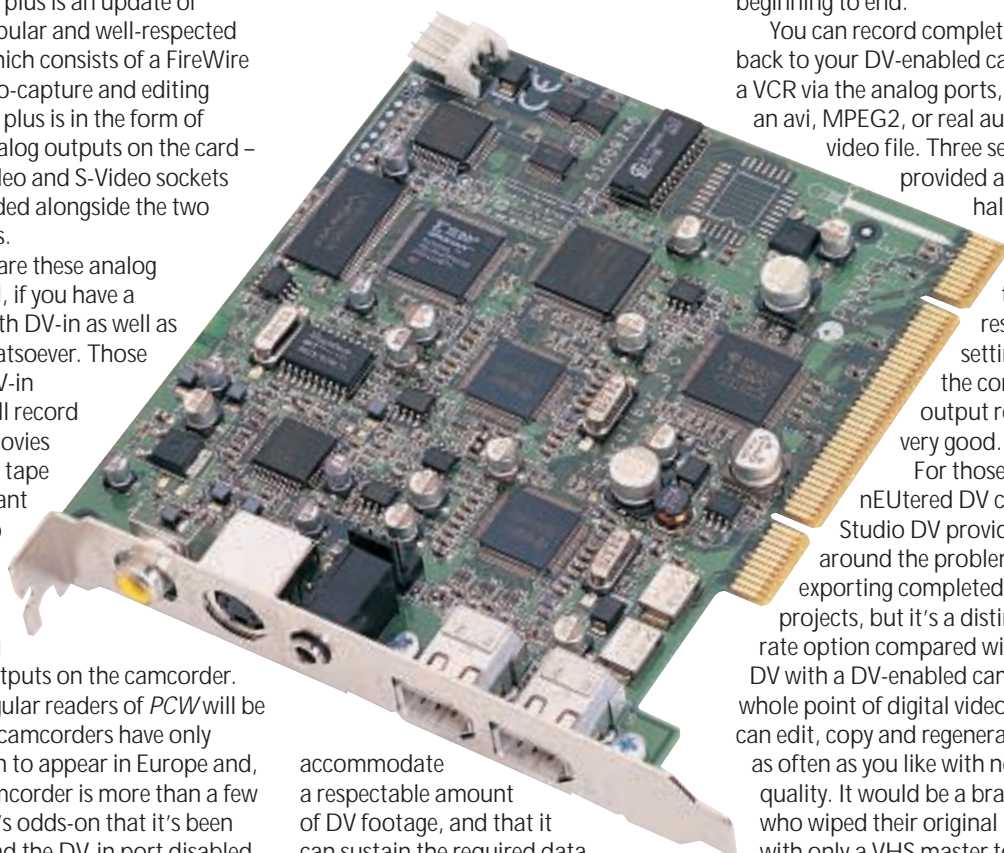
You can record completed projects back to your DV-enabled camcorder, to a VCR via the analog ports, or to disk as an avi, MPEG2, or real audio-streamed video file. Three settings are

provided at a quarter, half and full DV resolution. Even with the half resolution setting turned on, the composite output results were very good.

For those with nEUTered DV camcorders, Studio DV provides one way around the problem of exporting completed movie projects, but it's a distinctly second-rate option compared with saving to DV with a DV-enabled camcorder. The whole point of digital video is that you can edit, copy and regenerate video files as often as you like with no loss in quality. It would be a brave person who wiped their original DV footage with only a VHS master to fall back on.

So the analog outputs are at best a short-term solution. In every other respect the Studio DV is what it always was, an excellent DV editing package for the casual user who wants results with the minimum of effort.

KEN MCMAHON



accommodate a respectable amount of DV footage, and that it can sustain the required data transfer rate. Device control, which is presented as a facsimile camcorder side panel with VCR buttons, worked faultlessly right from the start.

Studio DV uses a system called smart capture that recognises breaks in your footage and automatically generates clips. So, you can just press the capture button and it will automatically end a clip and start a new one whenever there's a break in the shooting or it recognises a scene change.

Then you just drag clips onto the storyboard and arrange them in the preferred order, adding transitions, sound effects and titling from the small libraries provided. Depending on your preferred editing method you can toggle between storyboard and a more conventional timeline view.

Studio DV allows you to work either

DETAILS

★★★★★

PRICE £198.58 (£169 ex VAT)

CONTACT www.pinnaclesys.com

PROS Excellent DV capture editing and output features; analog-out ports

CONS Analog-out ports not the best transfer method

OVERALL Still a good-value choice for DV editing, although analog out may not be all that much of a 'plus'

HP PhotoSmart 315

Great for indoor use and it's got Digital Print Order Format and several reviewing functions

HP is branding a whole raft of products with the PhotoSmart banner. While this can help reinforce a unified image, it does make things somewhat complicated because there is no quick and easy way of knowing that a PhotoSmart 1218 is a printer while a PhotoSmart 315 is a camera. This time around, we've got hold of the latter, HP's budget 2.1 megapixel snapper. Spec-wise, it has a lens rated at an aperture of f2.8 with a focal length of 5.8mm, which is equivalent to 38mm in a standard 35mm camera. This is protected by a sliding cover that, when opened, also switches on the device. Sensitivity is rated at ISO 100, and there's a 10-second auto timer, so you can put yourself in the picture, so to speak. Connection to the PC is via USB.

A well-balanced 227g and about the size of a box of kitchen matches, the 315 is comfortable to hold and use. The minimal number of controls means you quickly get the hang of things, and the on-screen menu has just three top-level entries, so it's impossible to get lost. There's no optical zoom, so you have to rely on the digital alternative, which crops and zooms the image to create the effect of a 1.5x, 2x or 2.5x magnification. A couple of years ago you'd have given this feature a wide berth, but with higher-resolution models like this it becomes a more viable option. Even so, we'd still recommend leaving this kind of work to your image-editing software.

Unfortunately it takes only CompactFlash Type I memory cards (so no IBM Microdrive), and the card supplied stretches to just 8MB. HP claims that this will hold 10 'superfine' images at 1,600 x 1,200 with low compression, and our tests showed this to be pretty much the case. Up the compression to the 'fine' setting and it'll stretch to 20, while dropping the resolution to 640 x 480 will squeeze in up to 80 low-res images.

Exposure and focus are both automatic, but we found the latter to be poor. We took images at a range of distances, and in almost every instance there was evidence of some blurring to the edges of many subjects. There was also some graininess, particularly where there is a considerable expanse of sky that you would expect to feature smooth transitions between areas of tonal variation. Moreover, jpeg compression was poorly handled, and where contrasting colours met, say at the edge of a light building against a blue sky, there was an undesirable halo



effect. Images were sadly not up to the quality of those produced by the lower specified (and lower priced) Epson PhotoPC 650 reviewed in our January digital cameras group test. This won't be a problem if you're going to shrink your results for emailing or use on a website, but if you're going to print them – and the 315 features an IR window for wireless printing on a PhotoSmart printer – you may be disappointed.

You can review your images on the 1.8in LCD, and you can also use it to frame shots if you don't get on with viewfinders. This screen has a fast refresh, which is a great improvement on HP's early digital cameras, but it is difficult to view outside. You can increase the brightness, but this isn't really the problem – it's more one of contrast. It can't be faulted when used inside, though, and the review function has

some handy features, including thumbnail views, or zooming in to 4x magnification so you can scroll around and examine every detail. It's from here that you can also create a DPOF (Digital Print Order Format) file. A DPOF file keeps track of the photos you select so that when you next drop the card into a compatible printer it will send just those to paper without any further work from yourself.

In the box you'll find a set of alkaline AA batteries, and you can invest in an optional power cable. PhotoImpression

and PhotoMontage software, both from Arcsoft, also make an appearance. The driver software is quick to set up and easy to use, but the default installation runs to 117MB and even the minimum stands at a rather chunky 63MB dropping a camera detection icon in the system tray.

We were disappointed that, having chosen to go for the minimum install, the interface still showed unavailable options, and when clicked they threw up an error. We'd like them to at least be greyed out, or for the popup to say something other than that the application had been 'moved, removed or corrupted'.

HP is a big name in digital imaging, but the PhotoSmart 315 left us cold. It's not expensive, but even at this price we expected better.

NIK RAWLINSON

DETAILS

★★★★

PRICE £299 (£254.47 ex VAT)

CONTACT HP 08705 47 47 47

www.hp.com/uk/

PROS Inexpensive; DPOF functionality

CONS Image quality could have been better

OVERALL It feels good in your hand, but doesn't perform as well as we would have liked

Sony LCD projector

This high-quality portable unit is small, light, easy to set up and use and produces a good image

The VPL-CX1 is one of four ultra-lightweight LCD projectors recently launched as part of a concerted effort by Sony to dominate the market for portable projectors. The new models share the design and some of the features of the CS1, which has been around since early last year and which Sony claims is the best-selling projector in Europe with sales of more than 25,000 units.

The CX1 is Sony's smallest and lightest projector to date, weighing in at 2.9kg and with a compact footprint of 277 x 79 x 214mm (w x h x d). To put it another way, you can cover it with a sheet of A4 paper and it's about the thickness of a telephone directory. A latched front cover with built-in carrying handle protects the lens when the projector is not in use and opens outwards on a bottom-mounted hinge to tilt the projector slightly upwards. The power input is front mounted which is an awkward, not to mention ugly, arrangement.

The rear panel houses a D-SUB VGA connector, S-Video and composite video inputs, a PS/2 mouse connector, USB up and downlinks and stereo audio in. Above this are two small stereo speakers that, despite the noise of the fan, provide adequate sound for presentations, but aren't up to the job of satisfactorily rendering a movie soundtrack.

Setting up the CX1 is straightforward. There's a six-position spring-mounted lockable foot at the rear that you can use to adjust the projection angle, and digital keystone adjustment is made via the on-screen menu (OSM). You can adjust the focus and zoom manually using two lens bezels accessed from a cut-out panel in the top of the projector. The zoom ratio is a generous 1.3:1, allowing you to adjust the image size by 30 per cent, so you should have no problem producing the right sized image without having to shunt the projector back and forth. Screen coverage ranges from 40in diagonally to a maximum of 150in.

The top panel features three large buttons for power, input signal selection and Automatic Pixel Alignment (APA),

which minimises ghosting and other artefacts. Smaller recessed buttons provide volume adjustment and seven further buttons are arranged into a menu pad providing access to the OSM and a range of functions that can also be accessed via the remote controller.

Though it's not uncommon to provide remote mouse functions via a USB upstream connection, the downstream USB port, to which you can connect a USB device, such



as a digital camera, is something of a novelty. The upstream connection provides both remote mouse operation as well as PC control of up to 127 linked projectors from a desktop PC using the supplied Projection Station Version 2 software.

Remote control of the mouse is not always easy to get the hang of, but the mini joystick arrangement on the CX1 remote controller isn't difficult to master. Other useful remote features include separate sound and image muting, digital zoom and two programmable function buttons that can be used, for example, for single-button launching of an application or file from the remote.

Having reviewed a succession of DLP projectors over the past few months we weren't expecting to be bowled over with the CX1's picture quality, but were pleasantly surprised. The conventional wisdom is that DLP excels with video output and is superior for home

entertainment, and LCD projectors provide a clearer, sharper image for computer-generated data such as applications, desktops and text and chart-based presentations.

The CX1, however, performs exceptionally well with all kinds of data. Icons and text in office apps are bright and clearly defined. The CX1 is an excellent home entertainment system for both DVD and VHS material using the S-Video input. Focus is sharp and illumination levels constant right across the image area. The 120w lamp produces 550 ANSI lumens that compares well with many other models,

and isn't noticeably less brilliant in a fully darkened room than

DLP models quoting 800 ANSI lumens.

Where you will notice a difference is when there is a high degree of ambient light. The CX1

struggles to produce a readable image in low levels of fluorescent lighting, whereas projectors producing upwards of 1,000 ANSI lumens, such as the Infocus LP350, cope much better in these situations.

One other limitation worth mentioning is that the image can't be flipped horizontally or vertically, so back projection and ceiling mounting are out of the question. Not much of an issue, you might say, for a portable device, but it's something most of the competition offers, portable or not.

KEN MCMAHON

DETAILS

★★★★

PRICE Approx £2,750

CONTACT Sony www.world.sony.com

PROS Small and light; easy setup; flexible zoom; good remote functions; USB up and downlinks

CONS Weak in poor lighting conditions; no back projection or ceiling mounting

OVERALL A very good-quality portable LCD unit. An obvious choice for anyone who needs PC control over several units, and it competes well on features (though not performance) with more expensive DLP models

HP OfficeJet K80

Four functions from one device, saving space and without compromising on quality

Think multifunction device and the first name that springs to mind will probably be HP. The company has a long history of producing these products for the home or small office, but while functionality and performance have never been too much cause for complaint they've never been all that attractive, and this latest addition to the range is no exception, looking like an overstuffed pillow with paper trays. In its favour, a lot of thought has obviously gone into the control panel layout, with buttons grouped by function so you immediately know where to look for faxing, scanning or copying. It's not all that large, either; especially if you compare it to the amount of desk space you need to house separate devices for each function.

HP has a reputation for well-written drivers, and it's bucking no trends here. Once installed, you need only drop a page into the unit's feeder and a menu pops up on screen. You then simply pick the function you want. Connection is by USB or parallel cable, but if it's not hooked up or your PC is turned off, fear not – each function is duplicated on the hardware itself. The two-line display is home to a surprisingly effective menu system that pretty much duplicates the software driver.

For your £400, you get 100 speed dials split across 10 buttons and a 20-page document feeder for unattended faxing. It's top dog as far as faxing speed is concerned, shifting an average page in just three seconds. It has colour faxing capabilities, compatible with international standards, and if you're wondering what the point would be when you don't know anyone with a colour machine to receive one, just remember that once people said the same thing about the phone. If you run dry of paper or ink over the weekend, there's a 100-page memory to capture incoming faxes that will be printed when you next refill.

The scanner is a sheet-fed device, so you'll not be able to copy books, but it has a respectable 600 x 1,200dpi optical resolution that can be upped to 600 x 3,600dpi through interpolation. TWAIN

compliant, it can also make use of the 20-sheet fax input feeder – great for archiving documents. It's Internet ready, which in HP terms means it can work as an email device without you even touching the PC. Once you register the product with ShareMedia, it's given its own email address, so you can scan straight to someone else's email inbox, and receive incoming messages just like a fax. Currently available in 15 European countries, as well as in Canada and the US, this is a far from proprietary standard.

It's not unusual for a software driver to let you scan



to an application, but with the K80 you can also do this from the hardware button panel. Scroll through the apps it understands, and when you get to the one you want it will be launched on the PC, ready for the incoming image. It has a range of pre-defined scan settings to cater for photos, editable text, text as an image or mixed content. Perhaps a little strangely, though, mixed content scans at 300dpi in 24bit colour, while photos default to the same bit rate but a resolution of only 150dpi. The scanner can be used for colour or monochrome copying, with the option to scale the output to between 25 and 400 per cent.

So that's what it does, but how well does it do it? We used our standard test documents (see inkjet printers group test, July 2000) and overall were rather impressed. Our A4 photograph was completed at high quality on photo paper in five minutes 18 seconds, and

the output was first class. Skin tones were realistic and there were smooth transitions between tonal variations. Moreover, where dark colours bordered lighter ink there was no undesirable bleeding. It produced a batch of business letters at a rate of one page every 13 seconds and on photocopy paper the quality was excellent, with crisp, sharp characters and no evidence of bleeding, even on small dense characters. It also coped admirably with a range of PowerPoint slides – printing them as handouts, with three foils to each sheet of inkjet paper. Colours were well rendered with no feathering around the edges. Time to completion for 12 slides was two minutes 21 seconds. In all, the K80 has a good eye for colour, and when it came to copying a promotional brochure

the output was a good match for the original. It was on vector graphics that the K80 really excelled, though, with bright, vibrant colours, good scaling and smooth colour transitions, so it should be good for business documents that include graphs and charts.

If you're in the process of setting up a home office, an all-in-one device makes good sense, combining the functionality of a fax, scanner, copier and printer in one handy unit. The K80 takes up less space than any two of these items would as separate units, and by lumping them all together like this you're not forced to compromise on quality. Do bear in mind, though, that when you're putting all your eggs in one basket like this, if just one part goes, all four machines are out of action until you get it fixed.

NIK RAWLINSON

DETAILS

★★★★★

PRICE £399 (£339.57 ex VAT)

CONTACT HP 08705 47 47 47

www.hp.com/uk/

PROS Great print quality; excellent hardware and software interfaces; good price

CONS Not particularly fast

OVERALL A well-rounded machine for the smaller office

SMC Network Starter Kit

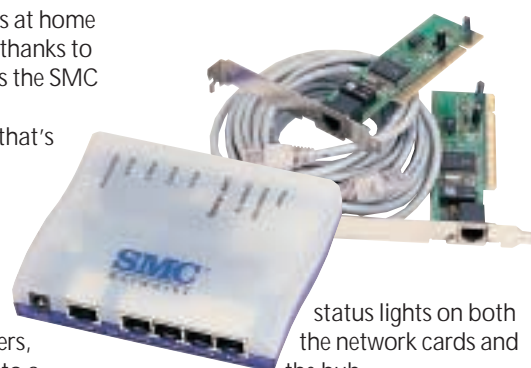
This handy kit lets you network up to five home PCs and has room for expansion

Connecting multiple PCs at home isn't that much hassle thanks to networking kits such as the SMC Network Starter Kit.

The kit provides everything that's needed to get two machines networked – two PCI 100Mbps/sec network cards, two five-metre cables, and a 10/100Mbps/sec hub.

For future expansion the hub has four ports for computers, and a fifth port for connecting to a second hub. A crossover network cable wired in reverse to a standard cable can be used on any standard port to do the same job, though. Likewise, a crossover cable can be used on the fifth hub port to connect a fifth machine.

In the meantime, getting two machines up and networked is a simple task. The network cards need to be installed into free PCI slots, and connected using the provided cables into the hub. After powering on the PCs, the connections can be verified via



status lights on both the network cards and the hub.

Assuming this is all right it's time to install the correct drivers inside Windows. Now comes the slightly trickier part: getting the PCs to talk to each other.

This requires setting up the network protocols, which tell the computers how they should talk to each other. The manual recommends removing TCP/IP – the same protocol that the Internet uses – and installing NetBEUI instead, which makes file and print sharing a doddle.

Unfortunately, this is all you can

do, and while the box proudly says you can use this kit to share an Internet connection, no software is provided to do this. Windows 98 has this built in, but it's a nightmare to set up and requires TCP/IP to be installed.

It's a shame that such an important area isn't covered in what is otherwise a solid piece of kit.

DAVID LUDLOW

DETAILS

★★★

PRICE £99 (£84.26 ex VAT)

CONTACT SMC 0800 0188 733

www.smc-europe.com

PROS Easy to set up; can connect up to five PCs using the provided hub

CONS No software for Internet sharing

OVERALL It's everything you need to get your computers talking to each other, but the package would benefit from additional software to share an Internet connection

Creative WebCam Plus

This cute camera is painless to install and if you're on a budget, this is what you've been looking for

Housed in the familiar shell of the WebCam Go Plus is one of the cutest cameras going, and the lens, with unmarked but easily tweaked focus ring, delivers a consistently sharp image, even in low light. Behind this sits a 0.3megapixel CCD delivering resolutions up to 640 x 480, and the bundled software lets you scale this down for use on a website where VGA images are just too large.

The software is similar to that found in the Go Plus range – WebCam Monitor for sending images to a site, and the control application for tweaking settings such as image size and the jpeg compression level. Installation is painless, and once up and running everything is pretty much self-explanatory, which is just as well, because the documentation is far from comprehensive.

PC connection is by captive USB



cable. We were disappointed when we saw this because the 'Go' range has a removable lead. Then we remembered that captive cables are the norm, and the only reason you can detach a 'Go' is to use it as a standalone digital camera. You can take pictures with the WebCam Plus, too, using the button mounted on its head, but only while connected to the PC. A green light on the front shows

when you're plugged in, so bear in mind that this reflects in night-time windows and will be seen in the image if you want to set up a 24-hour spy-cam.

The WebCam Plus delivered exactly what we expected. When it comes to producing this kind of device, Creative is very much the company to beat, and nobody has yet managed to do it. If the only thing that stopped you buying a Go Plus was your budget then you're exactly the person Creative was thinking of here.

NIK RAWLINSON

DETAILS

★★★★★

PRICE £49.99 (£42.54 ex VAT)

CONTACT Creative 08708 760 876

www.europe.creative.com

PROS Superior image quality; easy-to-use software

CONS Inadequate documentation

OVERALL The best cam around if you don't need walkabout functionality



Poser 4

Making a welcome return this 3D animation package makes a complex job fun

The '3D character animation and figure design tool' is back after a brief corporate hiatus, now published by Curious Labs, a company set up by the people who created the software in the first place. Version 4 is a fairly extensive revision, and it includes a number of new facilities for adding clothes, rendering animations as cartoons and sketches, and for more detailed model sculpting. The interface has been tweaked, but thankfully retains its exceptional elegance, making this one of the most pleasant graphics packages to use.

As in earlier versions, to create a character you begin with a preset figure from a library. There is a selection of basic sizes, shapes and species to get you started. Human characters can be clad in a variety of clothes (not all of which fit that well). There are libraries of hairstyles, facial expressions, hand positions, props and preset poses.

Figures are split into body parts, each with appropriate parameters that can be adjusted either interactively, or using a series of dials. For example, on the face, you can alter the height of eyebrows, the shape of the chin, the pucker of the lips, even the amount of 'worry' in the expression. The female chest is fully adjustable for breast size, cleavage, droop and 'Hi-nipple'.

Once you have found the required level of worry and nipple elevation for your character, you can get it to move. Poser has a 'Walk Designer' to help achieve what is a formidably complex animation job. There is a selection of preset walks, each of which can be tweaked by adjusting such parameters as 'head bounce' and 'hip swing', with a preview window giving you an idea of the results. There are also various 'blends', such as the 'power walk', with a slider allowing adjustment from a pantomime mince to a 'look-at-me-I'm-master-of-the-universe' stride.

Even more powerful is the ability to import motion files created using motion-capture systems. Several of these files are included with Poser's second



A dancer whose movements have been choreographed using a motion-capture file



Smile, please, though only at a setting of 0.5, combined with a frown set at 0.5. The knurled knobs down the right-hand side are for adjusting the face parameters



Each element in the interface can be moved or hidden. The handles on the bottom and the left pull out drawers of animation tools and libraries of preset figures and poses

'Content' CD-ROM, and when applied to a figure they really bring it to life.

The lighting controls are improved and very easy to use, as are the rendering tools. Single frames and animations can be rendered photorealistically, as a cartoon or even 'painted' as a series of brushstrokes. The latter is achieved using the new 'Sketch Designer', which has a variety of parameters for picking brushes and colours, and presets so you can choose styles from 'soft charcoal' to 'JacksonP' (as in Jackson Pollock).

Poser 4 is enormous fun to use, but with its slick interface and amusing parameters it's easy to forget that it is trying to achieve a formidably complex task. Creating and animating believable characters, be they talking humans, marauding robots or dancing cows, is perhaps the most challenging task in 3D graphics. Poser helps, but you cannot hope to produce professional results without a lot of hard work and access to other resources. For example, the tools for building and texturing models have been improved, but are still quite basic. Most users will probably find they need to use

specialist 3D modelling software to create realistic characters from scratch.

There is an entire CD-ROM devoted to sample models and animations, but the range is sparse and mostly aimed at marketing third-party products. A readme file in the CD's root folder promises a host of samples that are not even on the disk. However, there was an entire folder of motion-capture files featuring a range of dance moves.

Another concern is the lack of context-sensitive help – almost essential for a product of this complexity. When you invoke help through the Help menu, all you get is a pdf version of the manual.

Such shortcomings are partially alleviated by Poser's exceptional third-party support. There is a busy, almost fanatical community of enthusiasts that users can draw upon for tutorials, resources and advice. There is also a growing number of companies that sell content online.

Whatever its limitations, Poser is great fun, thoughtfully designed and good value for such a powerful 3D tool.

BEN WOOLLEY

DETAILS

★★★★★

PRICE £199.95 (£170.21 ex VAT)

CONTACT Computers Unlimited

020 8358 5857 www.curiouslabs.com

SYSTEM REQUIREMENTS Pentium or higher processor, Windows 95, 98, NT (SP3) or later, 64MB of RAM, 400MB hard disk space, 24bit colour display

PROS Wonderful interface; powerful controls; good third-party support

CONS Basic modelling and texturing tools; sparse content; poor online help

OVERALL Makes one of the most challenging jobs in 3D graphics enormous fun

BETA

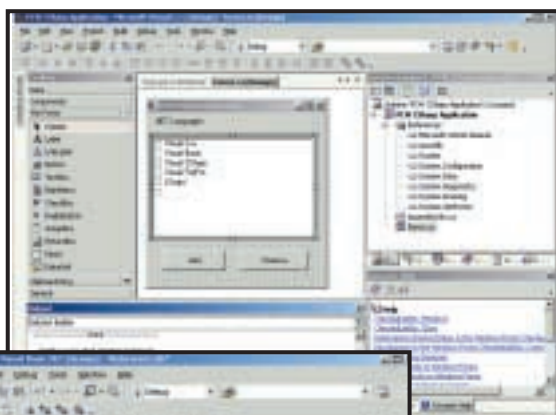
Visual Studio.Net

This major advance for Windows developers has great RAD and strong web development tools

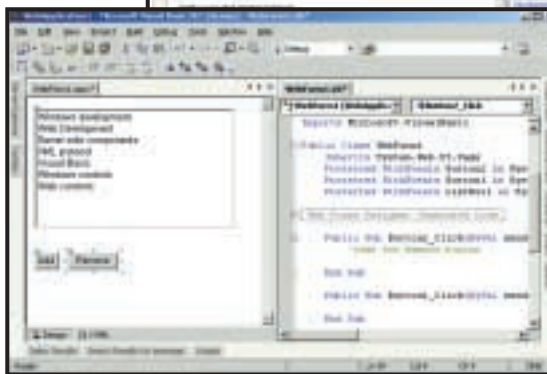
Microsoft's new Visual Studio is its most significant development tool since Visual Basic in 1991. This product targets the .Net Framework, Microsoft's common runtime layer that has the potential to run across multiple platforms. Even if it is never ported beyond Windows, it represents a fundamental change in how applications are developed on the Microsoft platform. Instead of writing code for the hugely complex Windows API, developers can use a new, clean, and fully object-oriented class library. Application types include WinForms, which are traditional Windows applications, or WebForms, where the user interface is presented in a web browser using the .Net version of Active Server Pages (ASP). The design of the .Net Framework lets you use a class library from any .Net language.

Another radical change is in the component model. Until now, Microsoft has heavily promoted COM (Component Object Model), the technology behind ActiveX controls and used in high-end multi-tier applications. The .Net Framework has its own built-in component model and does not need COM. New-style components are also easier to deploy, since they no longer use the Windows Registry. Finally, the .Net Framework has both security and component versioning built in, solving two of the most persistently troublesome aspects of the Windows platform.

Although the .Net Framework is fully supported, Visual Studio.Net is a transitional product. Visual Basic and C# (Microsoft's new language) compile exclusively to the intermediate language (IL) used by the Framework. Visual C++ can target either Win32 native code, or the .Net Framework. Visual FoxPro targets only Win32. The ASP development tool in previous versions of Visual Studio, Visual InterDev, no longer exists, being replaced by the WebForm designer available to all .Net languages. The other transitional aspect is the interoperability between the .Net Framework and old-style Windows and COM applications.



Left: The WinForm designer, toolbox, project explorer, output window, and dynamic help



In this view of a web application, the tool windows are both docked and hidden. The WebForm is an HTML web page; the VB code is in a separate file and runs on the web server

Any COM component can be used in a .Net app, and any .Net component can be exposed to a COM app. ActiveX controls can still be used, and you can easily call Win32 native code in dynamic link libraries (DLLs). This interoperability is critically important, since typical .Net applications will use Microsoft's BackOffice server applications, which are native Win32 code.

Apart from Visual FoxPro, all the Visual Studio languages now use the same IDE (Integrated Development Environment) and form design tools. Online help is fully integrated into the IDE, complete with a dynamic Help feature that lists relevant topics in a docked window as you focus on different code words or tools. Docked windows can be set to auto-hide, giving increased screen space for actual coding or visual design. There is also good use of tabbed windows, letting you flip quickly between visual and code views, and the code editor now has collapsible code blocks for easy navigation of large files. A WebForm is an HTML page, so Visual Studio includes a web page designer with both visual and source code editing.

Visual Basic developers will have to come to terms with many changes. The

language has suddenly grown up, and many often-requested features have appeared. These include full inheritance, classes that have proper constructors, and structured exception handling instead of the archaic 'On Error Goto'.

The downside is that backward compatibility has gone out of the window. There is sufficient compatibility that converting old code should not be too difficult, but errors can easily creep in. As a language it is hugely improved, although a little more demanding for novices. It is also a full .Net citizen, ending the old dilemma about whether to choose C++ power or VB productivity.

Visual C++ looks more familiar. There are two major new features: managed extensions for .Net as mentioned above, and Attributed Programming – a way of simplifying COM development by specifying attributes for classes. Although managed extensions let you compile to IL, it is disappointing that you cannot use the WinForm designer with Visual C++.

For web development this is a great improvement. Instead of VB Script, VB is available for web apps, running on the server for cross-browser compatibility. Web services use the XML SOAP protocol to handle remote object invocation.

TIM ANDERSON

DETAILS

★★★★★

PRICE Not yet announced

CONTACT Microsoft 0345 002000

www.microsoft.com

SYSTEM REQUIREMENTS Not announced

PROS Excellent RAD tools combined with fully object-oriented languages; common runtime combines good performance with potential portability; strong web development tools built on a great upgrade to ASP

CONS No RAD form designer in Visual C++; lack of backward compatibility in Visual Basic; Visual C++ still not fully ISO compliant

OVERALL Visual Studio.Net is a major advance for Windows developers

Do\$h Invoice

An invoicing system for small businesses that is very easy to set up and use

The first Do\$h product was released to market in May 1997 and was inspired by the experiences of its creator in his career as a chartered accountant. Jonathan van der Borgh and his son, Matthew, designed a cashbook program that was so simple to use that small-business managers could successfully find their way around it in a day, and Do\$h Invoice is the latest in a line of Do\$h spin-off products offering sole traders and small businesses a unique product to help generate invoices and record and manage their sales activities quickly and easily.

Do\$h is extremely easy to set up and quickly creates an organised invoicing system. The program first generates a database of customers, complete with details of goods and services supplied, from information given by users. There are facilities to store additional data such as VAT rates, credit details and trading terms.

Invoice provides enough fields to enter all the information you could possibly need to record for each of your customers, including bank and credit reference details, as well as the standard name, address, contact and credit term details.

The details you input relating to the products and services supplied by your company can be as specific or general as you wish. The option is there to include, as well as the type of product or service you provide, such things as the quantities in which it is produced and variations of brand and colour.

The buttons on the toolbar offer a light-hearted alternative to the norm, with a variety of pictures – we particularly liked the pink pig on the cash received/paid button that flips over onto its back when payments, rather than receipts, are entered.

Invoices and credit notes are entered using the data entry button and there is a facility to enter proforma invoices that can be reviewed and altered as required, reducing the need to raise credit notes to correct invoicing errors. Only when you are happy that the information is correct, is the invoice posted to the ledger and printed off for delivery to the customer. Invoice numbers are allocated automatically so there is no chance of mistakenly issuing the same number twice and proforma invoices are given a

Customer Name	Balance	0-30	31-60	61-90	91-120	121-150	151-180	181-210	211-240	241-270	271-300
ABC COMPANY	1000.00	1000.00									
DEF COMPANY	500.00		500.00								
GHI COMPANY	200.00			200.00							
JKL COMPANY	150.00				150.00						
MNO COMPANY	100.00					100.00					
PQR COMPANY	50.00						50.00				
STU COMPANY	25.00							25.00			
VWX COMPANY	12.50								12.50		
YZA COMPANY	6.25									6.25	
TOTAL	2043.75	2043.75	500.00	200.00	150.00	100.00	50.00	25.00	12.50		

The Aged Debtors Summary shows clearly all money outstanding on your customers' accounts

temporary number prior to posting, at which point they are allocated the next sequential invoice number.

We did find, though, that it was possible to accidentally select different customers rather than just different products or services when producing sub-entries on a split invoice. In such cases the program posts all the items to the last customer selected without raising a warning message. Without careful checking of invoices before sending them out this error could be missed and the wrong customer invoiced, which could be embarrassing.

As well as the Aged Debtors Summary, which gives a clear view of all monies outstanding on your customers' accounts at any given time, there are detailed customer reports for all related transactions in any time period and a summary of sales by product type and service. The invoice/credit note list shows all notes raised in numerical order showing their status, ie posted or proforma, and provides a useful summary for use when preparing the VAT Return. We liked the fact that each customer's telephone number is printed on the Aged Debtor Report for quick reference.

Along with the Debtors Account report you get a choice of three chasing letters to send to your customers and an on-screen reminder of the action you have taken to date. There is a very limited selection of changes that can be made to the predetermined format of the letters but they provide an adequate series of demands for payment if you prefer not to spend time preparing individual letters to each of your customers.

The Sales summaries allow you to run

regular reports to track the goods usually ordered by each customer and investigate any items that seem to be less in demand, which could highlight a deterioration in quality or that your prices are no longer competitive and your customers are going elsewhere for certain products.

The invoice produced is a clear and professional-looking document so you don't need to purchase expensive preprinted stationery. The facility to add your own logo provides a nice finishing touch.

Within the next 12 months Do\$h plans to integrate all its products, making it possible to share information between the Cashbook, Cash Control, Invoicing and Payroll, while the Do\$h Small Business Club gives members 30 per cent off software purchases and provides annual updates as well as unlimited telephone support.

SHEILA FRANKLIN

DETAILS

★★★★★

PRICE From £89 (£76 ex VAT)

CONTACT Do\$h Software 01403 273 590

www.dosh.co.uk

SYSTEM REQUIREMENTS 486 processor running Windows 95, 98, NT, 16MB of RAM, 10MB of free hard disk space, CD-ROM

PROS Provides total control of Aged Debtors easily and accurately

CONS Care needs to be taken not to switch customer when entering sub-entries on a split invoice

OVERALL An impressive package for the small business at a realistic price

Vegas Video 2.0

A great package that's worth checking out if you're heavily into video editing

Sonic Foundry's Acid Pro multitrack audio program made a huge impact on the world of audio thanks to its amazing realtime pitch shifting and timestretching abilities. It was a real time saver when it came to dealing with audio loops. So has the company managed to pull the same trick with video editing?

Vegas Video shares a similar interface to Acid so may seem a little strange in comparison to other video-editing packages. You drag raw material such as unedited audio and video onto a timeline and work on it from there. However, items dragged onto the timeline are treated as events, so all edits are non-destructive.

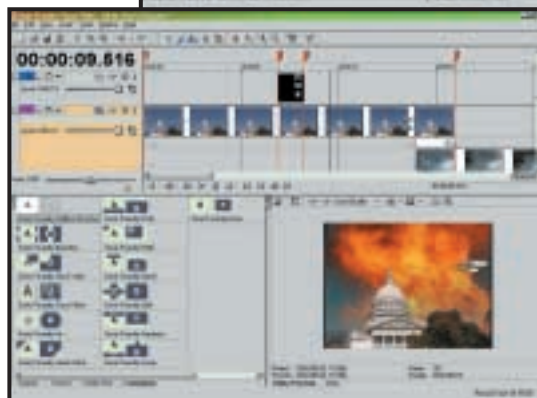
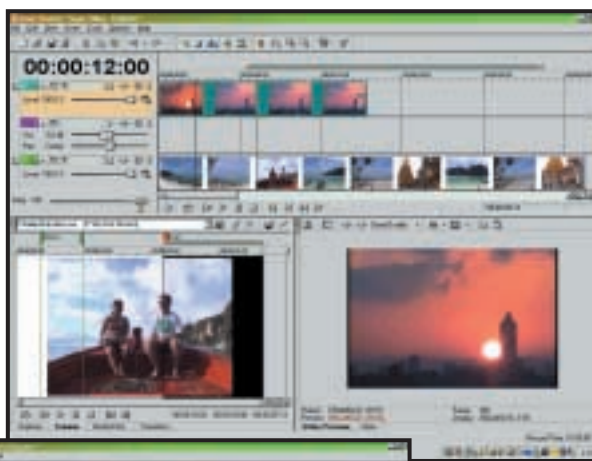
In Vegas Video there's a big difference between media assets, events on the timeline, tracks, filters, and envelopes. It's important to grasp the differences, especially if you're not familiar with other Sonic Foundry products. Media assets are the raw unedited media – audio, video or still images. Events are parts or all of a media asset – Vegas Video allows you to trim and crop events without destructively affecting the asset media. Tracks are assigned to events once you drag media onto the timeline. You can then apply effects (such as Gaussian Blur or Pixellate) and envelopes (for controlling opacity or the speed of a cross-fade) on a per track basis or a per event basis. You can also add effects on the video output that will affect all video present in the project.

This all leads to a very flexible system where you can apply an overall filter to a track, and then add an extra filter to an event to make it stand out from others.

Vegas deals with audio in almost the same way as it does video. They both share the same timeline and even processes such as adding effects and envelopes are handled in the same way.

Speaking of effects, Vegas supports video and audio plug-ins that conform to the Direct X standard, so there's plenty of potential for expansion. The software comes with a good starter set of video plug-ins and all three of Sonic Foundry's XFX audio plug-in packs.

Vegas Video is also fully OHCI-compliant, so when working over



*Top: You can trim events without destructively affecting the asset media
Bottom: Create complex layered effects*

FireWire you can operate the transport controls of your camera from the software. The video capture element of the package is a separate program that can either be started independently of the main application or launched from a button on the main Vegas Window.

It's not the most fully featured capture software available. For example, it can't capture still images and doesn't support batch capture of any kind. But it's fine for day-to-day capture tasks.

Vegas Video doesn't allow device control of the camera when recording back to tape. This means it's possible to miss a few frames of your movie, because you've got to start playback before you hit the record button on your camera.

To preview a file you click on it in the Explorer-style window at the bottom of the screen. Any editing can also be previewed (at a lower quality setting) once you've finished tweaking. You can even continue making edits on the project while a preview is playing. If you need a high-quality preview you can pre-render a scene and Vegas Video will save the

rendering for use in future previews as well as the final output.

Vegas does try to take the pain out of video editing. For example, when you drag video events over each other Vegas creates a cross-fade between them. You can right-click on the cross-fade to change its settings or replace it with another effect, such as an additive

dissolve. Touches like these speed up editing, but it doesn't have the complete wow factor that Acid had when dealing with audio loops. Nevertheless, Vegas Video's ease of use is very impressive.

If you're going to indulge in video editing you'll need a reasonably beefy system. But Vegas also requires a recent OS. You need at least Windows 98 SE just to get the software up and running. On the positive side, though, it is fully Windows 2000 compatible and top marks go to Sonic Foundry for also supporting multi-processor systems.

Vegas Video is an excellent product. Quality comes at a price, but if you're in the market for a serious editing package and were looking at Adobe's Premier, you owe it to yourself to check out Vegas Video before parting with your cash. If you don't have £600 lying around you may want to wait for VideoFactory, the cut-down version of Vegas Video, which should have a more wallet-friendly price.

NIALL MAGENNIS

DETAILS

★★★★★



PRICE £599 (£509.75 ex VAT)

CONTACT SCV London 020 7923 1892

www.sonicfoundry.com

SYSTEM REQUIREMENTS Pentium II 400MHz, Windows 98 SE, NT4, 2000, 128MB of RAM, 20MB of hard disk space, CD-ROM

PROS Ease of use; good selection of video and audio plug-ins

CONS Needs a beefy PC and a recent OS

OVERALL While Vegas Video is not the complete breath of fresh air we were expecting, it's still a fantastic product and deserves your attention if you're in the market for a high-end video-editing package

Cakewalk Pyro

CD burner/riper combo, but it's not that easy to use

Cakewalk is well known for its professional sequencing software, which is a favourite among PC users, but Pyro is the company's first move into mainstream consumer software. At its most basic level the package is a combined CD burner, MP3/WMA creator, CD ripper and file manager.

When you first load it up you're presented with quite a simple interface. From here you can see your PC's directory structure in the top half of the screen and the playlist and function buttons on the bottom half. You can drag and drop files from your hard drive onto to the playlist, but you can't just select a bunch of tracks on a CD and add them in one go – you first have to copy them onto your hard drive. Tracks can be converted into either .wav, MP3 or WMA files, but conversion options are quite limited. You can't, for example, create Variable Bit Rate (VBR) MP3 files.

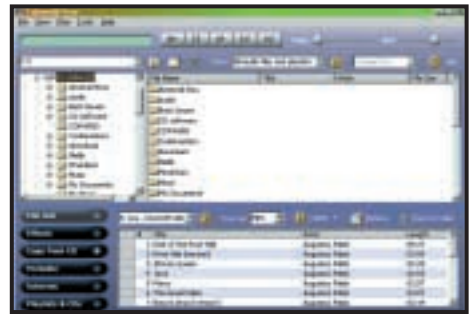
Pyro has built-in support for Direct X effects such as reverb and echo that can

be applied to files you copy across to your playlist. However, we didn't find this function particularly useful in day-to-day use.

If you've got a RIO 300/500 or a Nomad I/II MP3 player, Pyro can interface with these directly, otherwise you're going to have to copy files across to your portable device from another piece of software.

Unfortunately, Pyro falls awkwardly between being a full-blown CD mastering tool and a quick and easy CD creator. It fails in the first instance because it doesn't have the features necessary for pro mastering and falls short in the second because it's just not as easy to use as, say, Easy CD Creator.

On the plus side it does use the Fraunhofer MP3 codec, which is arguably the best on the market, but then so does Musicmatch, a free download from Musicmatch.com. Pyro also includes software to design labels for CDs, but it's a tad awkward to use and a few easy-to-follow wizards to



get you up and running wouldn't have gone amiss.

All in all, Pyro just doesn't offer the ease of use of other packages around.

NIALL MAGENNIS

DETAILS

★★★

PRICE £39.99 (£34.03 ex VAT)

CONTACT Et Cetera Distribution

01706 228 039 www.cakewalk.com

SYSTEM REQUIREMENTS 200MHz CPU, 32MB of RAM, Windows 95, 98, CD-R drive (check website for supported CD-R drives)

PROS Direct X plug-in effects support; WMA encoding

CONS A tad awkward to use. Not much here that you can't get for free on the net

OVERALL It just isn't as simple to use as others

RedShift 4

If you want to explore the Universe for just £20 check out this desktop planetarium

RedShift 4 describes itself as the definitive desktop planetarium and version 4 comes on two CDs, and promises exploration of the entire Universe for just £19.99.

As with previous versions, RedShift 4 is all about recreating a view of the night sky from anywhere in the Solar System, at any date between 4700BC and 9999AD. Why spot the stars from Earth, when you could do it from Saturn, or the surface of one of Jupiter's moons?



The rendered planetary surfaces look great, especially as day turns to night, but it's not all about pretty pictures. Behind the scenes are a number of accurate star catalogues, with version 4 boasting use of the full Tycho-2, 4M and Hubble Guide Star catalogues, along with the NGC of variable stars, Washington Double Star, and Principal Galaxies catalogues.

Multiple windows allow you to simultaneously view an event from different locations. The sky diary keeps track of events from eclipses to meteor showers and planetary conjunctions.

Beyond its planetarium capabilities, RedShift 4 is a great educational tool. It includes the updated Penguin and Jacqueline Mitton *Dictionaries of Astronomy*, which feature over 425 photos and explanations of everything from orbital elements to orthoscopic eyepieces. Better still are 10 fully narrated multimedia

lectures from Big Bang theory to the history of the Solar System.

RedShift won't control your telescope or offer the advanced star-mapping capabilities that really serious astronomers require, but it's genuinely useful for virtually everyone else, along with being great fun and educational without ever patronising.

GORDON LAING

DETAILS

★★★★★



PRICE £19.99 (£17.01 ex VAT)

CONTACT Focus Multimedia: 01889 570 156

www.focusmm.co.uk

SYSTEM REQUIREMENTS P200, 64MB of RAM, 80MB disk space, Windows 95, 98, 2000

PROS Bargain-priced, useful, fun and educational without being patronising

CONS Serious astronomers may require more accuracy and telescope control

OVERALL An almost faultless PC-based planetarium that everyone will enjoy

HP NetServer E800

Aimed at small businesses that want an expandable server up and running quickly and easily

If you run a small business and are looking to invest in a new server on which to base your network, then there are three things that you should be looking out for. They are price, scalability and performance.

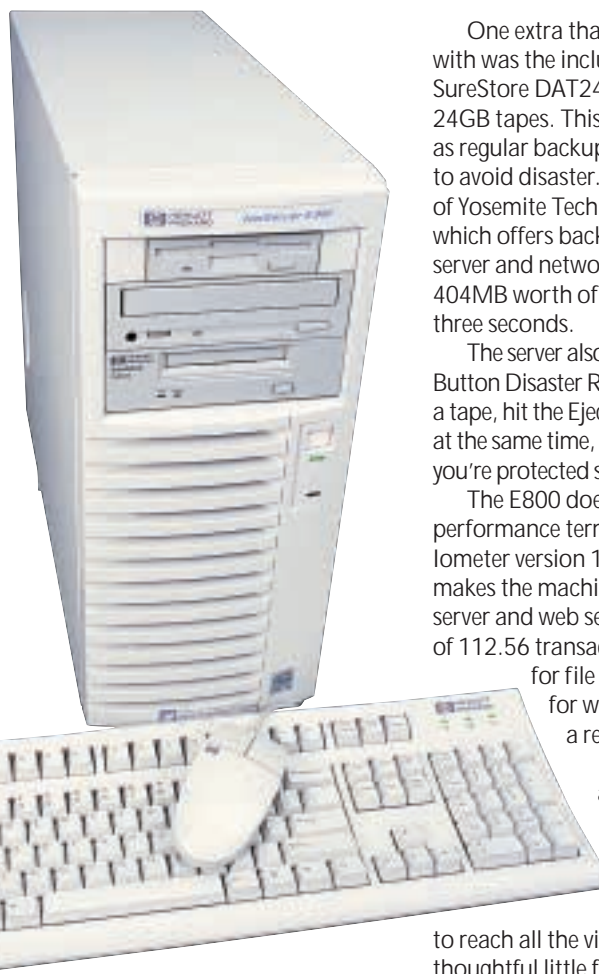
Many people believe that sheer performance is the most important factor, but this should not be the deciding element. Scalability and price are much more important, and this is what HP has targeted with its latest workgroup server, the NetServer E800.

It offers a dual-processor capable motherboard, with seven PCI expansion slots – two of which are 64bit. This will be more than enough for the average small business for many years. The motherboard is an Asus CUR-DLS, and although only one processor was included on our review unit – a Pentium III 733MHz – should you need to upgrade in the future you will have no problems.

Access to the guts of the machine is achieved by unlocking the case and removing six thumbscrews. This is a vast improvement over some of HP's earlier efforts in this area where access and the ability to upgrade could be problematic due to a lack of space and poor layout.

The motherboard also offers an onboard SCSI controller that frees up yet another PCI slot should you need it. The only problem here is that the SCSI interface does not have an external connector. Wake-on-LAN is also supported.

Our server contained only 128MB of ECC PC133 SDRAM memory. Should you need it, though, this can be increased to an impressive 2GB, which is more than enough for most applications



the server to offer a massive 145GB worth of internal storage.

New drives are inserted into the drive cage which can be slid out by removing three screws – two that are easy to reach and one not so easy. One minor problem we came across was that only half-height drives can be inserted – unless you are handy with a pair of long-nose pliers.

Although the E800 is very well designed, the unit we received is a bit

One extra that we were impressed with was the inclusion of an internal SureStore DAT24 tape drive, and two 24GB tapes. This is extremely important, as regular backups are essential if you are to avoid disaster. Also included is a copy of Yosemite Technologies' TapeWare, which offers backup scheduling for the server and network. We backed up 404MB worth of data in eight minutes three seconds.

The server also comes with HP's One Button Disaster Recovery – simply insert a tape, hit the Eject and Power buttons at the same time, and Bob's your uncle: you're protected should the worst happen.

The E800 does reasonably well in performance terms. Running Intel Iometer version 1998.10.08 (which makes the machine operate as a file server and web server) returned results of 112.56 transactions per second (tps) for file serving and 113.96tps for web serving. In short,

a respectable set of results.

Overall, HP has put a great deal of thought into this machine. There is plenty of expansion potential, it's easy

to reach all the vital components, and thoughtful little features such as SCSI cable clips will keep frustration to a minimum.

As a final point, the manual that is included to aid with upgrading is excellent and so easy to follow that even those unfamiliar with server technology will have no problems.

DAVID RAE

There is plenty of expansion potential and it's easy to reach all the vital components

under the sun, apart from intense number crunching. Reaching the memory slots is again very easy, and shows how good the internal layout is.

As for internal storage, the E800 comes equipped with a 9.1GB SCSI hard drive held in a cage that has enough room to hold a further three hard disks. If you really need to, you could upgrade

sparse. As we have already said, there is no external SCSI connector, but on top of this there is no RAID card, just 9.1GB of storage and 128MB of memory. While it is fair to say that not everyone would want a fully specced machine, you may need to upgrade this one almost as soon as you install it unless you opt for one of the more expensive configurations.

DETAILS

★★★★

PRICE £1,968 (£1,675 ex VAT)

CONTACT HP 0990 47 47 47 www.hp.com

PROS Excellent expansion potential; well thought out internal design; HP SureStore is a very useful addition

CONS Might need upgrading too soon; no room for full-height hard drives; no external SCSI connector

OVERALL The HP NetServer E800 is designed for the small business that doesn't want to play about with technology too much. It fulfils this role very well, and you would be hard pushed to find a better machine for this price, and aimed at this market

3Com Internet Server

A one-stop-shop Internet solution for small businesses that's very easy to set up

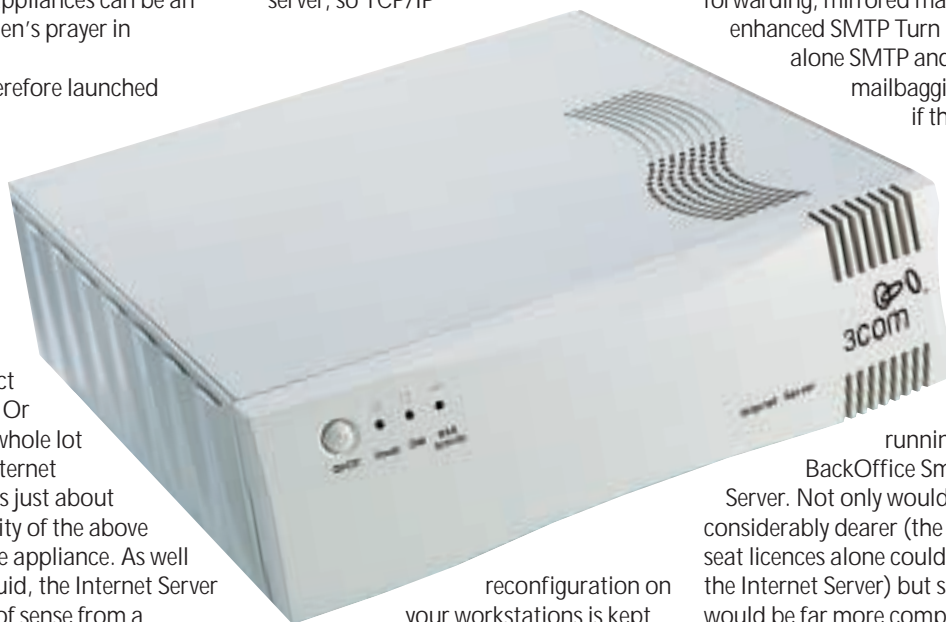
Network appliances are all the rage at the moment and it's in this area that 3Com has chosen to kick off its small-business initiative. Appliances are devices that are as simple to use as, say, a domestic television – you just plug it in, set it up once and it just works from that point onwards. Any network device can be a nightmare to configure, especially for small businesses that can't afford dedicated IT staff, and so network appliances can be an answer to a maiden's prayer in this regard.

3Com has therefore launched a range of small-business network appliances – the OfficeConnect Network Storage Server, the OfficeConnect eMail Server and the OfficeConnect Internet Firewall. Or you can buy the whole lot in one unit, an Internet Server, which rolls just about all the functionality of the above products into one appliance. As well as saving a few quid, the Internet Server also makes a lot of sense from a management point of view – as the need for uptime, security and data protection in today's 'dot' economy take IT infrastructures to ever more complex levels, concerns over the interoperability of various system components becomes an almost overwhelming task for even experienced IT professionals.

So what do you get for your money? Well, at first glance, not a lot. The Internet Server is essentially a small PC, sans keyboard and monitor. Open it up and you'll find a 500MHz Celeron processor and a 10GB hard disk drive: not exactly mouth-watering. Look further, though, and its usefulness becomes clear. At the rear, you'll find a 10/100 Ethernet card in one of the two PCI slots, plus a serial port and an integrated 10/100 Ethernet port, labelled 'WAN'. Hooking it up to your existing 10 or 100BaseT network is a piece of cake – you plug the Internet Server into your hub and then plug a modem (or ISDN TA) in to the nine-pin serial port. You can also plug your WAN

gateway (eg ADSL or ISDN router) into the WAN socket. Either way, this is how your network accesses the Internet.

The next step is to install the IS Clients on each workstation. Although there's no reason it can't support other platforms, Internet Server only supports Windows 9x, NT4 and 2000. It can support up to 50 clients comfortably and as it runs a version of Linux, there are no additional licences to pay. The Internet Server is a DHCP server, so TCP/IP



reconfiguration on your workstations is kept to an absolute minimum. You then point your browser to the Internet Server's IP address and run through a configuration wizard to configure the server, add users, specify your ISP details and so on. If you have all this to hand, this job can be completed in a quarter of an hour. It takes 10 times this to just install Microsoft BackOffice Small Business Server.

There's no internal backup provision, but you can set up a scheduler to back up regularly to another network device. Reporting options are pretty good, too and the Internet Server lets you generate reports in all the key areas: for email usage, Internet access/connection and system security.

Once it's up and running, the device is managed via a web browser and so can also be remotely managed. It offers a laundry list of services – it's a plain vanilla file and print server and it's a web server, either externally accessible or via your intranet. It offers sophisticated firewall protection via Stateful Packet

Inspection (Network Address Translation is also available) and Remote Access, allowing remote users to access their files and emails. It's also an ftp, LDAP and DNS server, but probably most important of all, it's an email server that's compatible with Outlook Express and Netscape Messenger, though it shouldn't be too difficult to use other email clients. It supports SMTP, POP3, and IMAP4 mail protocols and a range of mail server types, such as Multi-drop mailbox forwarding, mirrored mailboxes and enhanced SMTP Turn Delivery, Stand-alone SMTP and SMTP

mailbagging. And as if that wasn't enough, it's also a proxy server. The closest rival to the Internet Server would be a conventional server running Microsoft BackOffice Small Business

Server. Not only would this be considerably dearer (the additional SBS seat licences alone could cost more than the Internet Server) but such a system would be far more complicated to set up and maintain. Such a system would undoubtedly be more sophisticated than Internet Server, but the core functionality is much the same. And that's what matters to small businesses: they're much more interested in 'fit and forget' solutions that just work – on that basis they should waste no time in checking out the 3Com Internet Server.

ROGER GANN

DETAILS

★★★★★



PRICE £1,674.37 (£1,425 ex VAT)

CONTACT 3Com 01189 278 300

www.3com.com

PROS Genuinely easy to set up and run one-stop Internet solution for small businesses

CONS Windows-only clients; dig down a little and complex configuration options are exposed

OVERALL The Internet Server is just what the average small business has been waiting for

PERSONAL COMPUTER WORLD

BEST BUYS

YOUR GUIDE TO TODAY'S TOP PRODUCTS >>>>

ENTRY-LEVEL PC

Atlas
Meridian A800T ME



Based on the 800MHz Athlon, this PC has an Asus A7V motherboard, a 1GHz processor and has a 200MHz FSB augmented by 128MB of PC133 SDRAM. There is a 15.3GB IBM hard drive, as well as a Teac CD-RW drive and an eight-speed DVD-ROM drive for movie playback. It's also great for video-in-and-out functionality with a Prolink TV-tuner card.

Review November 2000, p192 Price £1,173.83 (£999 ex VAT)
Contact Atlas 07000 285 275 www.atlaspc.com

MID-RANGE PC

Panrix
Magnum 900



Built on the Asus A7V motherboard this PC has a 900MHz Athlon, 128MB of PC133 memory, a 40GB Maxtor DiamondMax Plus hard disk and a BURN-Proof CD-RW. Its DVD is a slot loading AOpen drive, while graphics are covered by a 32MB Radeon. With video piping out to the Mitsubishi Diamond Plus 91 19in monitor this is an excellent mid-range system with Windows Me.

Review December 2000, p75 Price £1,761.33 (£1,499 ex VAT)
Contact Panrix 0113 244 4958 www.panrix.com

HIGH-END PC

evesham.com
Origin DDR Ultra



A fast machine with a 1.2GHz Athlon processor, an Asus A7M266 motherboard, a hefty 60.5GB Maxtor hard drive, a Teac W512EB CD-RW, a Pioneer 16-speed DVD drive and much more. Making use of the latest technology, including a Creative SoundBlaster Live! 5.1 Player card and Creative's Desktop Theatre 5.1 DTT2200 speaker set, you can't go wrong with this system.

Review March 2001, p153 Price £2,055.08 (£1,749 ex VAT)
Contact evesham.com 08707 287 070 www.evesham.com

FULLY-FEATURED NOTEBOOK

IBM
Thinkpad A20P



This well-built notebook exudes quality. The Thinkpad has a mobile Pentium III 700MHz, 128MB of RAM, 16MB ATI mobility M3 graphics, 18GB hard drive, DVD, floppy and all the ports you need except FireWire. IBM's Ultrabay 2000 allows you to swap the DVD for optional extras, and the 1,400 x 1,050 TFT is a shining example of a 15in screen.

Review November 2000, p93 Price £2,205.47 (£1,877 ex VAT)
Contact IBM 0870 010 2512 www.pc.ibm.com/buydirect

ULTRA-PORTABLE NOTEBOOK

Sony
Vaio PCG-Z600NE



The Z600NE has taken everything that was good about the original and made it that little bit better. It is built around a 650MHz Pentium III SpeedStep processor, which drops the speed and voltage of the CPU in order to preserve battery power. With 128MB of RAM, a 12GB hard disk, IrDA, a modem and a FireWire socket, the Vaio is both versatile and ultra-portable.

Review October 2000, p79 Price £2,399 (£2,042 ex VAT)
Contact Sony 08705 424 424 www.sony.co.uk

PDA

Psion
5mx



The Psion 5mx is a quality PDA weighing 354g. It has a screen resolution of 640 x 240, a serial connector for syncing with your PC and space for upgrading with Flash memory. The keyboard is excellent and responsive, ideal for its word processing capabilities. With 16MB of memory and 15MB of Flash memory this is an ideal handheld computer.

Review December 2000, p220 Price £347.49 (£295.99 ex VAT)
Contact Psion 0990 143 050 www.expansys.com

PDA**Handspring
Visor Platinum**

A 33MHz Motorola Dragonball VZ processor makes the Platinum about 50 per cent faster than its predecessor. The battery meter now has a '3D' appearance and the address book functions have single tap duplications.

Review January 2001, p90 **Price** £249.10 (£12 ex VAT)
Contact Handspring 020 7309 0134 www.handspring.com/uk

WEBCAM**Creative
WebCam Go Plus**

With 8MB of memory and a built-in mic, the WebCam Go can also be used as a low-res handheld snapper or video camera. With excellent image quality and software you can snap up to 150 pictures in 32bit colour.

Review October 2000, p96 **Price** £104.57 (£89 ex VAT)
Contact dabs.com 0800 138 5240 www.europe.creative.com

SOUND CARD**Creative Labs
SB Live! Platinum 5.1**

The best consumer sound product just got better. Creative has added onboard 5.1 channel Dolby Digital processing and an infra-red remote control. It's got every connector you could ever ask for and is truly the card for sound enthusiasts.

Review January 2001, p102 **Price** £144.52 (£123 ex VAT)
Contact dabs.com 0800 138 5240 www.europe.creative.com

SCANNER**Epson
Perfection 640U**

This well-rounded 36bit TWAIN-compliant scanner has a maximum optical resolution of 600 x 2,400dpi, is easy to set up and comes bundled with Adobe PhotoDeluxe Home Edition.

Review February 2001, p188 **Price** £119 (£101.28 ex VAT)
Contact Epson 0800 220 546 www.epson.co.uk

BUDGET LASER PRINTER**Brother
HL-1250**

Offering better than average resolution of 600 x 1,200dpi, this reasonably priced printer has the low running cost of 1.2p per page and comes with 4MB of RAM, expandable to 36MB.

Review March 2001, p174 **Price** £316.08 (£269 ex VAT)
Contact Brother 0845 606 0626 www.brother.co.uk

COLOUR PHOTO PRINTER**Epson
Stylus Photo 870**

Aimed at the professional imaging user, our test photo was beautifully rendered, there was no evidence of undesirable banding and skin tones were accurately reproduced.

Review July 2000, p206 **Price** £173.90 (£148 ex VAT)
Contact dabs.com 0800 138 5240 www.epson.co.uk

BUSINESS LASER PRINTER**Hewlett-Packard
LaserJet 4050TN**

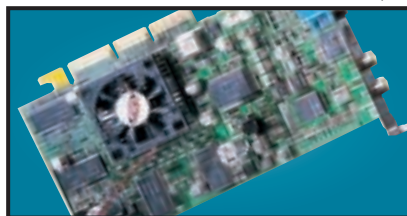
The 4050TN's 1,200dpi resolution is outstanding, and with a 133MHz NEC processor and 16MB of RAM it can turn out 16ppm. It also comes network-ready as standard.

Review September 1999, p96 **Price** £1,185.57 (£1,009 ex VAT)
Contact dabs.com 0800 138 5240 www.europe.hp.com

DIGITAL CAMERA**Sony
Cyber-shot DSC-P1**

Squeezing in a 3x optical zoom this compact boasts 3.3megapixels. With 15-60-second video capturing capability and a built-in speaker, there are some great features here.

Review January 2001, p202 **Price** £699 (£594.89 ex VAT)
Contact Sony 0990 111 999 www.sony.co.uk

GRAPHICS CARD**ATI
Radeon**

With an integrated Transform and Lighting engine, the Radeon also supports hardware environment bump mapping for lifelike surfaces and its 32bit performance is second to none.

Review October 2000, p199 **Price** £229 (£194.89 ex VAT)
Contact ATI 01628 477 788 www.atl.com

MOBILE PHONE**Nokia
6210**

Weighing 114g, this lightweight WAP phone has a larger memory than its predecessors and supports HSCSD. It uses Nokia's WAP 1.1 browser, which is the most intuitive around.

Review December 2000, p87 **Price** £129.99 (£110.63 ex VAT)
Contact Nokia 0990 003 110 www.nokia.com

EIDE HARD DRIVE**IBM
Deskstar 75GXP**

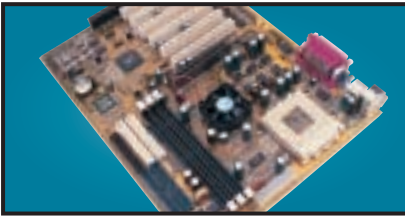
A 75GB drive with an areal density of 11GB/sq in. It has a spindle speed of 7,200rpm, a 2MB data buffer and an average seek time of 8.5ms. A lot of storage for the money.

Review September 2000, p109 **Price** £404.20 (£344 ex VAT)
Contact dabs.com 020 8523 4020 www.dabs.com

SCSI HARD DRIVE**Quantum
Atlas V**

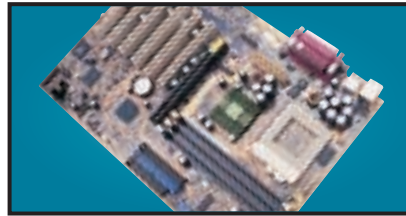
Increased areal density makes this 36GB drive impressive. It may not be as fast as 10,000rpm drives, but with seek times around 6.3ms and a spin rate of 7,200rpm, it's good value.

Review July 2000, p100 **Price** £528.75 (£450 ex VAT)
Contact Quantum 01344 353 500 www.quantum.com

SOCKET A MOTHERBOARD**Abit
KT7 Raid**

This motherboard has a HighPoint HPT370 controller for onboard UltraDMA100 IDE RAID for anyone who needs a lot of disk space, a fan on the Northbridge of the chipset for overclocking and an ISA slot for any older cards.

Review December 2000, p100 **Price** £139.82 (£119 ex VAT)
Contact dabs.com 0800 138 5240 www.dabs.com

FC-PGA MOTHERBOARD**Asus
CUSL2**

A well laid out 815E motherboard that sports six PCI slots, two CNR slots and an AGP Pro slot. The documentation is first rate and the board is simple to set up. Quite expensive, but certainly worth the money.

Review November 2000, p219 **Price** £135.12 (£115 ex VAT)
Contact dabs.com 0800 138 5240 www.asus.com

PROJECTOR**Ask
M3**

This is 60 x 175 x 210 (h x w x d) and weighs in at 1.7Kg. It produces a very bright 1,000 ANSI lumen image, up to 230in diagonal that is easy to read even under fluorescent lights. With DVI and USB at the rear, it is versatile too.

Review December 2000, p107 **Price** £4,688 (£3,990 ex VAT)
Contact Ask-Proxima 01628 666 622 www.askproxima.com

17IN MONITOR**Iiyama
VisionMaster Pro 410**

This monitor has excellent image quality and vibrant colours. With resolutions on the Natural Flat aperture-grille tube up to 1,600 x 1,200 at 75Hz this unit is an ideal 17in solution.

Review September 2000, p192 **Price** £276.12 (£235 ex VAT)
Contact Iiyama 01438 314 417 www.iiyama.co.uk

19IN MONITOR**CTX
PR960F**

Equipped with an FD Trinitron tube this has a constant 0.24mm pitch across the screen. It also has an additional BNC input and a built-in USB hub as standard.

Review June 2000, p91 **Price** £374.83 (£319 ex VAT)
Contact dabs.com 0800 138 5240 www.dabs.com

21IN MONITOR**Sony
Multiscan G500**

The name Sony is synonymous with high-quality displays and this 21in FD Trinitron monitor is no exception. It has dual-input connectors and remains crisp even up to 1,800 x 1,440 at 75Hz.

Review May 2000, p226 **Price** £911 (£775 ex VAT)
Contact Sony 0990 424 424 www.sony-cp.com

LCD MONITOR**Synnex
18NE-TD**

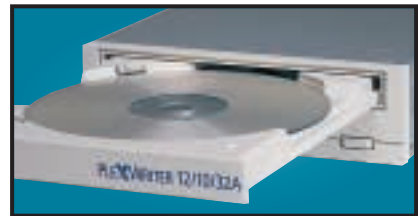
This 18in display has a native resolution of 1,280 x 1,024 and it only has a DVI connector. When connected to an appropriate graphics card, this will ensure a perfectly sized picture.

Review November 2000, p121 **Price** £1,761.33 (£1,499 ex VAT)
Contact Synnex 01952 207 364 www.synnexuk.com

DIGITAL VIDEO CAMERA**Sony
DCR-TRV20E**

Equipped with a 4MB Memory Stick, this weighty, robust camera has a resolution of 1,152 x 864 and the large LCD display allows great monitoring and playback without a separate monitor.

Review March 2001 p199 **Price** £1,150 (£978.72 ex VAT)
Contact Sony 0990 111 999 www.sony.co.uk

CD-RW**Plexor
PX-W1210TA**

This CD-RW uses Burn-Proof technology and has one of the fastest rewrite speeds around: 10-speed rewrite and 12-speed write, making using this loads of fun.

Review September 2000, p121 **Price** £185.64 (£154 ex VAT)
Contact dabs.com 0800 138 5240 www.plexor.com

REMOVABLE STORAGE**Panasonic
LF-D201 DVD-RAM**

With a disc capacity of 4.7GB per side, compatibility with existing 2.6GB and new 4.7GB per side discs, and a versatile software bundle, this is a great product for storing large amounts of data.

Review October 2000, p98 **Price** £351.33 (£299 ex VAT)
Contact dabs.com 0800 138 5240 www.panasonic.co.uk

BACKUP**OnStream
SC30**

The SC30 has a 30GB compressed data capacity and using Backup Exec it achieved over 70Mbytes/min. Echo software provides drive-letter access so you can treat it like a hard drive.

Review September 1999, p102 **Price** £370.13 (£315 ex VAT)
Contact dabs.com 0800 138 5240 www.onstream.com

DVD DRIVE**AOpen
DVD 1640 Pro**

An impressive 16-speed DVD reader that includes Cyberlink's Power DVD movie player. A first-class unit that marries excellent performance with solid build quality.

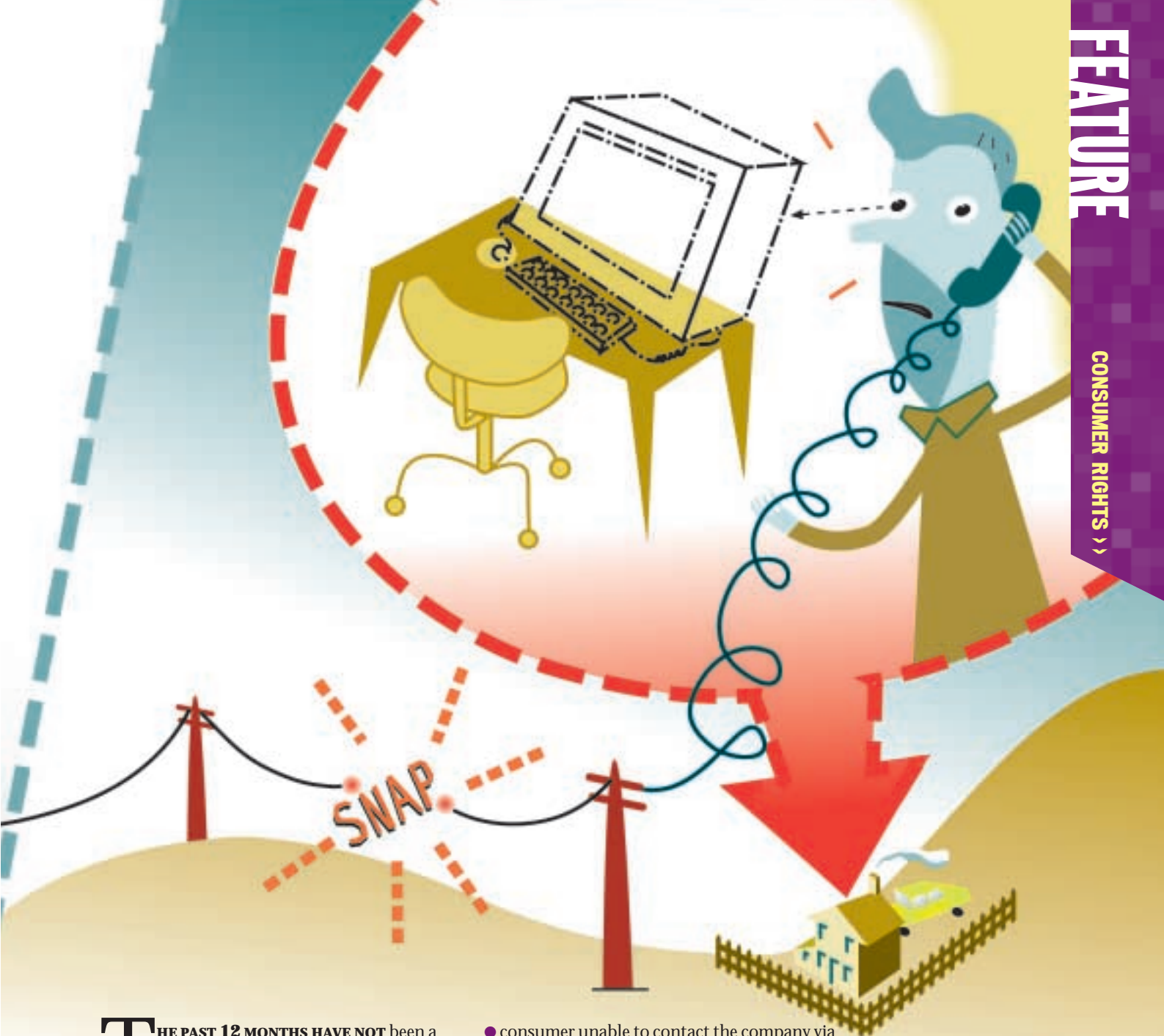
Review August 2000, p196 **Price** £118.68 (£101 ex VAT)
Contact dabs.com 0800 138 5240 www.aopen.nl

Buyer BEWARE

YOU DON'T HAVE TO PUT UP WITH SHODDY
GOODS AND SERVICES – FIGHT BACK! ROGER GANN
EXPLAINS YOUR RIGHTS AS A CONSUMER



ILLUSTRATION ANDY BAKER



THE PAST 12 MONTHS HAVE NOT been a rosy period for PC retailers. Far too often they have been shown in the broadcast media in a less than flattering light. Complaints range from sloppy service to the delivery of goods that bear no resemblance to those ordered.

A recent ecommerce survey neatly summed up the problem. The report from Plaut, called the *e>Returns Study*, revealed a fundamental flaw in the ability of many UK ecommerce websites (including those of PC retailers) to provide after-sales service. The report can be found at www.plaut.co.uk/pressserv/index3.htm.

Sadly, it seems that very poor service is far from exceptional – in fact it's the norm. Serious problems in the order cancellations and returns process were found in 72 per cent of websites, ranging from not refunding money to it being impossible to cancel orders online. Only 15 per cent of the companies examined provided a level of customer service equivalent to that expected by consumers on the high street. Defects in online customer care included:

- consumer unable to contact the company via phone or email;
- retailer delivered goods 21 days after confirming that the order had been cancelled;
- customer was charged for goods that had been confirmed as cancelled, despite retailer informing the customer that they would not be charged;
- retailer completely lost the online order and could not accept returns by post, suggested they were returned to nearest high-street store;
- retailer refunded money after goods were returned, minus the VAT and without any explanation.

And who were the guilty parties? Some surprisingly big names were singled out for criticism in the report, including Dell, Dixons and WH Smith.

Similar levels of dissatisfaction were revealed in a recent PC survey conducted by *Which?* The survey praised Dell but lambasted Time and Tiny. Of the nearly 14,000 users surveyed, almost 60 per cent had suffered hardware or software problems – most within three months of buying

Your rights under the law

The law says that goods you buy as a consumer must be:

- Of satisfactory quality – that is, they must meet the standard that a reasonable person would regard as acceptable, bearing in mind factors such as the way they were described, their cost and any other relevant circumstances. This covers, for instance, the appearance and finish of the goods, their safety and their durability. Goods must be free from defects, even minor ones, except when these have been brought to your attention by the seller; for example, if the goods are 'shop-soiled'.
- Fit for their purposes, including any particular purpose mentioned by you to the seller – for example, if you buy a computer game and you explain that you want one that

can be played on a particular type of machine, the seller must not give you one that cannot. The goods need only be reasonably fit for the purpose, but the seller is strictly liable if they are not.

- As described – on the package or a display sign, or by the seller. If you are told that a shirt is 100 per cent cotton, then it shouldn't turn out to be cotton and polyester.

These are your statutory rights. All goods bought or hired from a trader – whether from shops, street markets, mail-order catalogues or door-to-door sellers – are covered by these rights. This includes goods bought in sales. When you decide to complain, bear in mind how the item was described. A new item must look new and unspoiled as well as work properly, but if the goods are second-hand, or

seconds, then you can't expect perfect quality.

You don't have to accept a free repair or replacement instead of cash – you're entitled to the return of your money if the goods are faulty, or not as described, or not fit for their purpose. Absence of a receipt is also no obstacle: you're entitled to a refund as long as you can prove you bought the goods from that particular seller. You aren't legally obliged to return faulty goods to the seller at your own expense. If an item is bulky and would be difficult or expensive to return to the shop, ask the seller to collect it. This does not apply where you complain about faults after having accepted the goods, or if you received the goods as a gift.

However, you have no real grounds for complaint if you:

- Were told about the fault;

- Examined the item when you bought it and should have seen the fault;

- Did the damage yourself;
- Made a mistake when purchasing the item;
- Simply changed your mind about the item.

Even so, if you hold onto the goods for too long before returning them, you are deemed to have accepted them.

Under these circumstances you are not entitled to anything, but some traders have goodwill policies, that go beyond your statutory rights. For example, some stores will let you exchange goods that are not faulty, such as clothes that are the wrong size. It is always worth asking. As a rule, always add 'unchecked' along with your signature, if you haven't checked the goods for damage when they're delivered.

the machine. And when it came to recommending the brand, Time did especially badly with 16 per cent saying they definitely would not recommend the brand to a friend.

But wait, there's more; much more. The popular BBC1 consumer programme, *Watchdog*, has targeted the PC business. Tiny Computers, which claims to be Britain's biggest home computer retailer, got the *Watchdog* once-over back in November, prompted by the 236 complaints received about it in the previous three months. So incensed was one Tiny customer that he set up a website, in protest: www.jayw.demon.co.uk/Tiny/index.htm.

It was mail-order specialist Jungle.com's turn almost a year earlier, after the programme received dozens of complaints about faulty goods, failed deliveries and lost refunds. As a result, the Consumer's Association temporarily stripped Jungle of its WebTrader 'seal of approval'.

Unfair terms

To add insult to injury, plenty of computer companies don't play fair when it comes to the small print. Whenever you buy something from a major vendor you normally agree to be bound by their terms and conditions (T&Cs). Usually, no-one reads them because they're so boring, which is a pity as they can make interesting reading, particularly when

they attempt to limit consumer rights, something outlawed by legislation such as the Unfair Contract Terms Act.

We had mixed success in tracking down the T&Cs of the major computer sellers. In a perfect world, they'd be in plain view, on their websites. Some, such as Dell, have links to their T&Cs on their home page; others only display them when you're at the checkout, which we think is a pretty poor policy. Undoubtedly, Time is one of the worst offenders – not only are its T&Cs not on the website, they're only available on paper and can't be emailed to you.

Mesh Computers has typical T&Cs, full of legalese. Its standard terms are quite restrictive – if you don't like any of the terms, well, tough, they can't be changed, unless agreed in writing by a director, so don't rely on any verbal promises made by a salesperson. And if you buy software, well, you agree to be bound by the terms of the software licence, even though you haven't had a chance to read it. Any defect in the software isn't the responsibility of Mesh, even though it sold it to you. Touchingly, the buyer warrants that 'it has kept a backup of all the data in the equipment's memory banks', whatever they are. And no matter how late the delivery of your order, time will not be 'of the essence'. All in all, not very consumer-friendly.

Evesham's T&Cs are short and to the point, occupying just a page – Mesh's fill six pages. Insight's T&Cs are lengthy and restrictive, too,



but at least it makes clear that not every term applies to consumer, as opposed to business, transactions. Dabs.com's T&Cs are even shorter but not necessarily friendlier – it 'doesn't warrant the suitability of goods for a particular purpose'. If the goods you order aren't actually available, Dabs.com reserves the right to rescind the contract. However, minor specification variations don't allow the purchaser to rescind, which is somewhat inequitable.

PC World's T&Cs are clearly written but contain a few contentious terms. For example, 'no receipt, no refund' is one of them, a term clearly without any legal basis. Nor, it would seem, is PC World under any obligation to fulfil your order. Jungle's T&Cs are also a model of clarity, but again contain some iffy terms. For example, one seeks to make you bound by the software licence of any software you buy, even though you haven't seen it. Simply, too, has some corkers – if you haven't paid in full up-front for the goods, Simply can put the price up 'to reflect any direct or indirect increase in costs to the seller'. Acceptance of its terms is 'deemed' if you accept delivery of the goods. And once again, 'time of delivery shall not be of the essence' so if it is late with a delivery, you can't then make time of the essence.

Luckily, there is plenty of legislation to protect you, the consumer, against unfair terms like these. In fact, you're not bound by a standard term in a contract with a trader if it unfairly weights the contract against you. This applies in particular to exclusion clauses.

Examples include:

- penalty clauses and (except in special circumstances) terms that give the trader the

right to vary the terms of the contract (for instance, by increasing the price) without you having the right to withdraw;

- terms that try to stop you holding back any part of the price of goods or services if they turn out to be defective, or prevent you from withdrawing from the contract while allowing the trader to do so;
- terms that allow the trader to dishonour promises, for instance, ones made by salespeople.

The new law applies to standard terms – those you have not negotiated yourself – in contracts for goods and services that you buy as a consumer. It's up to the courts to decide if a term is unfair. If you think a term is unfair and you do not wish to be bound by it, you may wish to seek advice from your local trading standards department or Citizens' Advice Bureau. You can also write to the Director-General of Fair Trading. When he receives a complaint about a term he considers to be unfair, he can take action in court to stop its use in future contracts.

Legal stuff

Vendors might try to limit their liability towards consumers but the consumer occupies a surprisingly powerful position thanks to the provisions of the UK's extensive consumer protection legislation. Much of this can be traced back to a revolutionary Act of Parliament: the Sale of Goods Act 1895. This Act was the result of a raft of court cases brought by disgruntled consumers against greedy, unscrupulous Victorian shops and companies. One case, perhaps more than any other, *Carlill v Carbolic Smoke Ball Co* (1893),

Can you get a refund on software?

Many vendors insist that 'opened software' can't be returned and that faulty CD-ROMs will be exchanged by the manufacturer. Clearly, they're trying to prevent people copying them before getting a refund but such a contentious and blatantly unfair term is unlikely get much sympathy from a judge when put to the test. For a start, the software licence is typically found inside the packing, which entails opening the package to read it, or it's displayed during installation.

Putting aside the whole question of enforceability of these 'conditions subsequent' as they're known, which are

terms applied after you've struck a deal, it seems that you have no remedy if you want to reject the terms of the software licence, because you've already opened the software so can't return it. This term is almost certainly unenforceable as it is wholly unreasonable.

Suppose though, that you're happy with the software licence and install the software, only to find it is unusable because of bugs. Interestingly, Microsoft's End User License Agreement (EULA) obliges you to buy its software AS IS and WITH ALL FAULTS. It also tries to exclude the Sale of Goods Act's implied terms of merchantable quality and fitness for purpose

but it's difficult to see that clause cutting much ice this side of the pond. The problem of buggy software seems to be particularly endemic to the cutting edge of personal computing – gaming. It seems that, if we are to believe most standard T&Cs, if a game won't run on our PC, then we have two choices: take it or leave it. Clearly, this can't be right.

We can understand that it's probably impossible to guarantee that a program will run on the myriad combinations of hardware that exists out there, but when vendors try to limit their liability by refusing to warrant 'the suitability of goods for a particular purpose' and then turn around and say

you can't return goods that don't work as promised, it does seem very unfair. On the one hand they're saying 'We won't tell you if it'll run on your PC' and 'You can't return it if it doesn't' on the other. A 'Catch-22' situation

Ultimately, in situations like this you have to return to first principles and rely on the protection offered by existing consumer legislation. It's worth noting that, in any event, the seller, not the software author, is responsible for the goods they sell and your contractual nexus is with them and not some third party. If they've sold you something that doesn't work properly, it's their problem.

Money back on unwanted Windows

Fancy having a bit of fun? Well, try taking up the offer contained in the Windows Licence Agreement. We can guarantee you hours of endless amusement! Most PCs these days ship with Windows pre-installed. But maybe you don't actually want or need Windows, perhaps you'd rather use Linux instead. Or, you've bought a Windows upgrade, say Windows Me, and then buy another new PC, which also has Windows Me pre-installed. Clearly, you don't need a second copy of Windows Me, so long as

you've only got it installed on one PC.

Well, the good news is that if you don't want Windows on your PC, you can get a refund. Or rather, that's the theory. The 'End User License Agreement (EULA)' of Windows Me states that 'if you do not agree, do not install or use the SOFTWARE PRODUCT; you may return it to your place of purchase for a full refund'. Quite unequivocal, you might think. Clearly Microsoft makes no distinction between OEM pre-installs and retail versions of

its software – the terms are the same. And what's a Windows Me refund worth? Hard to say, but probably not as much as the normal retail version.

Geoffrey Bennett in Australia actually managed to get a AU\$110 refund from Toshiba because he didn't want Windows on his new notebook. It wasn't easy and he found it an uphill struggle to receive the dosh for his Tosh as Toshiba was initially reluctant to cough up – see www.netcraft.com.au/geoffrey/toshiba.html for more juicy details.

Please note that that refunds are probably easier to obtain if you can prove you have never run the bundled copy of Windows on your machine, and thus can say that you have never accepted the terms of the Windows licence. The way to do this is to make sure that you boot from another OS, for example Linux, when you turn the PC on for the first time. Point your browser to the following link for more info on this fascinating subject: www.linuxmall.com/refund.

was responsible for getting consumer protection into the statute books.

The simple facts of the case, indelibly etched on many a law student's heart, were these: The Carbolic Smoke Ball Company sold a quack flu remedy. In a newspaper ad it offered £100 'reward' to anyone catching the flu despite having used the Smoke Ball. The ad also stated that the company had deposited £1,000 with a bank to show the sincerity of its offer. Mrs Carlill, an 87-year-old woman, bought a smoke ball, which, surprise, surprise, didn't fend off the dose of flu she then caught. Naturally, she sought to take up the kind offer made by the company, which unsurprisingly tried to waltz on the deal, claiming variously that it was an unenforceable bet, mere 'puff', or that there may have been an offer but there was no acceptance and so on. The company lost the case.

Although much amended since then, (it was superseded by the Sale and Supply of Goods Act 1979) this Act is one of the most important and commonly used pieces of legislation in the consumer protection world, most usually relied on by consumers wishing to exercise their implied rights after buying faulty goods. The Act was substantially amended by the Sale and Supply of Goods Act 1994, perhaps most notably substituting the term 'satisfactory condition' for the previous implied term of 'merchantability'.

Distance selling protection

The most recent piece of consumer legislation to hit the statute books is the EU Distance Selling Directive, which came in to force in November 2000. Consumers who purchase goods and services by phone, mail order, fax or via the Internet will soon be able to do so with

greater confidence thanks to this legislation. It provides consumers with:

- the right to receive clear information about the goods or services prior to purchase;
- confirmation of this information in writing or in another appropriate 'durable medium', eg fax or email;
- a cooling-off period of seven working days (and up to three months in certain instances) during which the consumer can withdraw from the contract (with some exceptions);
- unless agreed otherwise with the supplier, the right to receive goods or services within 30 days.

There will be a two-month transitional period to enable businesses to take on board the requirements of the regulations and the DTI has published a set of FAQs at www.dti.gov.uk/CACP/ca/dsbulletin.htm.

Hopefully you'll be lucky and never have to call any of these rights into play. However, most of us are likely to suffer poor service or be sold shoddy goods at some time in our lives so it's important to be aware of your rights just in case. Years of work have gone into developing these rights so that you don't have to put up with unsatisfactory service or sub-standard goods. If you need to, you owe it to yourself to use them.



Useful contacts

Citizens' Advice Bureaux www.nacab.org.uk/
 DTI www.dti.gov.uk/consumer_web/index.htm
 Office of Fair Trading www.oft.gov.uk
 The Court Service www.courtservice.gov.uk/fandl/forms_home.htm
 Lord Chancellor's Office www.open.gov.uk/lcd/civil/procrules_fin/cproc.htm
 The LawStore www.thelawstore.co.uk/index.htm

GAMES



Sele



3-D

Custo



OFFICE

MULTIMEDIA

PERSONAL TOUCHES

YOU WOULDN'T BE HAPPY WITH THE EXISTING DÉCOR IF YOU MOVED HOUSE, SO WHY PUT UP WITH THE STANDARD WINDOWS LOOK AND FEEL? TIM NOTT SHOWS YOU HOW TO PERSONALISE YOUR PC

Ever since the dawn of time, which was in around 1986, men and women have striven to make their personal mark on the Windows interface. Even in those days, you could change the colours of components and customise sounds to the extent of turning the warning beep on or off.

Since then, things have moved on somewhat, and the opportunity for choice – as well as that for spending vast amounts of time tinkering – has grown. We're going to take you on a guided tour of some of the ways you can shape Windows to your own practical and aesthetic demands. Although most *PCW* readers probably know how to change screen colours or wallpaper, we've included instructions on these elementary stages for those who are new to the bewildering worlds of PCs and Windows. Be warned that some of the tips and tricks here won't work with Windows 95, and please don't undertake mission-critical work and customise at the same time, especially if you are using untested utilities and shells.

Wallpaper

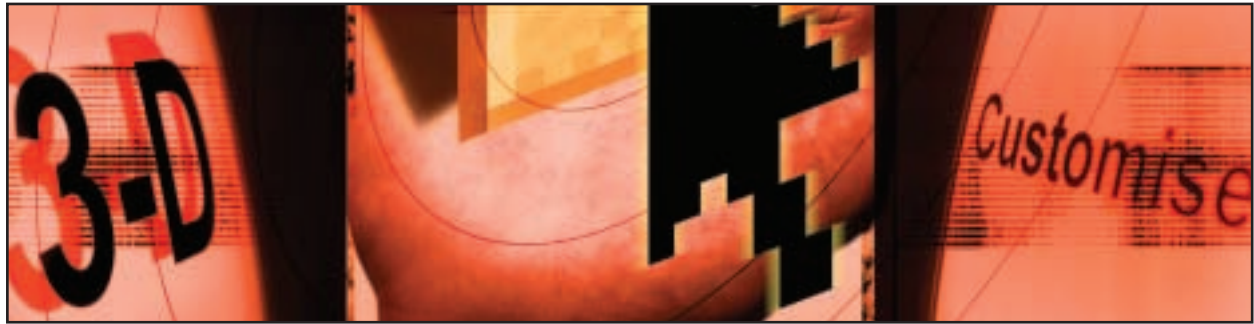
Changing your wallpaper – the full-screen desktop background – couldn't be easier. Right-click on the desktop, click Properties on the pop-up menu and go to the Background tab. Windows provides a few rather dull papers, so you'll probably want to find your own. Hit the browse button, and go to wherever you keep your picture files. Note that if you want to use anything other than the bmp format, you'll need to enable the Active Desktop – see the workshop later. You have a choice of tiling, centring or stretching the wallpaper, which should be self-explanatory. If you are going to stretch the

image, do make sure it has the same width-to-height ratio as the screen – usually 4:3 – or the image will be distorted. For the very best results, use a file that has exactly the same dimensions in pixels as the screen resolution.

This just leaves the problem of where to get wallpaper files. The obvious answer is from a scanner or digital camera, but if you don't have either of these then there are rolls of the stuff on the web. Type 'windows wallpaper' into any search engine and you'll see what we mean. We don't have room to attempt to summarise what's there, but we can draw your attention to some of the more unusual sites.

At <http://micro.magnet.fsu.edu/wallpaper/winpaper/>, which is part of the vast Florida State University microscopy site, there is a vast selection of photomicrographs covering everything from computer chips to Fuller's London Pride beer. The strangely named, but inoffensive, Digital Blasphemy site (www.digitalblasphemy.com) contains some stunning computer art images at sizes up to 1,152 x 864 for free. Members have access to hundreds more. For those with more conservative artistic tastes, why not download a Vermeer? The Rijksmuseum website (www.rijksmuseum.nl) has some stunning images of paintings at really high resolution: the Kitchen Maid you can see in the Win3D workshop is 1,600 pixels high by 1,429 wide. It's a shame Vermeer didn't work in standard Windows 4:3 format, but you can always trim the canvas down to size. For those of a more literary bent, why not hack a page out of the Gutenberg Bible? The British Library has recently completed high-resolution digitising of its two copies at www.bl.uk.

A multitude of shells to choose from



The ingenuity and generosity of Windows enthusiasts should never be underestimated. Alternative interfaces or shells are available for Windows – many for free, and most others offer a free trial.

We've included a workshop in this feature on Win3D, as it's free, looks good, runs 'straight out of the box' and we can tell you practically all you need to know in just 12 steps. Alternatives take more effort, but offer greater opportunity for the technically minded and graphically creative. We did a workshop on Window Blinds, back in August 2000, and the whole ethos is based on windows of any shape and texture you want. You'll find this – and other goodies such as transparent menus and window shadows – at www.stardock.net. Thematic Chroma, available at www.thematic.com/chroma/index.html offers

something similar – there are lots of pre-designed themes you can download, or the intrepid can roll their own with Cromumll – a 'powerful declarative layout language'.

If you don't find that much of a challenge, try www.winstep.net, where you will find WorkShelf – a multi-paged desktop replacement, and NextStart, a menuing system with a NeXT look and feel. Although neither of these are for the faint-hearted, the latter does automatically convert your existing Start menu.

At www.lighttek.com (two Ts, or you get a firm of electricians) you'll find Talisman, which can transform your PC into a 'magical world arranged as you like' and 'throw flowers and favourite photos on the screen'. Enough said.

3DTop, as the name suggests, is another 3D virtual world, which you can download from www.3dtop.com. Unlike Win3D it

doesn't come ready to run, and we had an interesting time getting to grips with it. There are some wonderful touches, including spotlights you can adjust and objects that spin in 3D or fly around. There's a good selection of work at the site, but 3DTop is not for those who suffer motion sickness.

Among the also-rans you'll find EWWW (<http://ewwm.unpaved.com/>) – 'not dead' but resting since March 2000. It has the distinction of combining the *Hitchhiker's Guide* and *Star Wars* in the same screenshot and also enables you to have a completely blank Desktop – without turning off the monitor.

The daddy of them all is probably Litestep (www.litestep.net), more a Linux-inspired community than an interface. Despite the geekspeak, many of the 1,000-plus themes are stunning. Worth a try, but don't inhale.

Appearance

Moving onwards, the next stop is the Appearance tab of Display Properties. Note that you can use this in two ways. First, you can click on the relevant parts of the picture for quick access. This won't, however, let you reach all the possibilities: you need to access some items from the drop-down list. We're not going to spend too much time hand-holding here – the thing to do is get in and experiment – but we will give you three tips. Make sure that you save your current settings as a named scheme before you start. Save settings you have lovingly created as a scheme, too, before exiting. And don't try to get shaded title bars if you are running 256 colours or fewer – it can't be done.

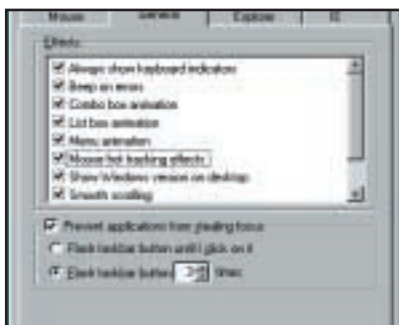
Icons

If you right-click on a shortcut and choose Properties, you'll see a dialog with a Change Icon button. You'll see similar buttons in Display Properties, Effects; and Explorer's View, Folder Options, File Types, Edit (Tools, Folder Options, File Types, Advanced in Windows Me). In each case, hitting the button takes you to another dialog, where you may or may not see further icons. If you don't see any – or none that you like

– hit the Browse button. Now it gets confusing, as although icons can exist as standalone ico files they are more usually wrapped up in an exe or dll file. Finding interesting ones can be a challenge, but to get you started, try browsing to `WINDOWS\SYSTEM\SHELL32.DLL`, `WINDOWS\PROGRAM.EXE` or `WINDOWS\SYSTEM\PIFMR.DLL`.

If you want to have more choice over which icons you can change, and a greater selection to choose from, then you'll need to get some software. There is a huge variety of icon management and icon creation software available for download, as well as legions of standalone icons. Or favourite manager is IconPackager, from Stardock, which you'll find at (www.stardock.com/products/iconpackager/). It's shareware, and the full version without nag screens cost \$14.95 (about £10). It will let you change icons practically anywhere, either by themed sets or individually. If you want to craft your own, our favourite is Axialis AX Icons. Once again, this is shareware, costing \$14 to register, but you can get hold of a trial version from www.axialis.com. In addition to providing all you need artistically, it will let you assemble sets of icons into libraries inside exe and dll files.

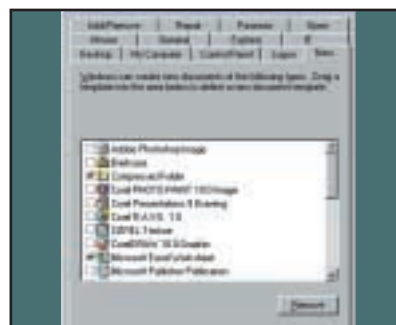
Streamlining Windows with TweakUI



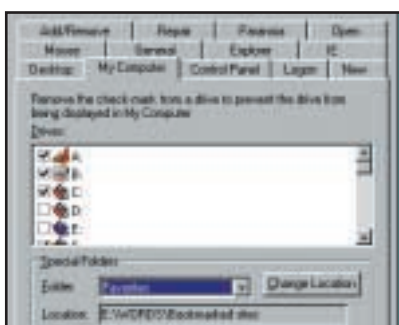
1 TweakUI is a Windows must-have for customisers. Originally available as a free, unsupported, download for Windows 95, it was standard on the Windows 98 CD. It was dropped from the Second Edition of Windows 98, and didn't reappear with the Millennium Edition. There's a happy ending, however, as a new version, claimed to work with all Windows versions, can be downloaded from www.microsoft.com/networkstation/downloads/power toys/networking/nttweakUI.asp.



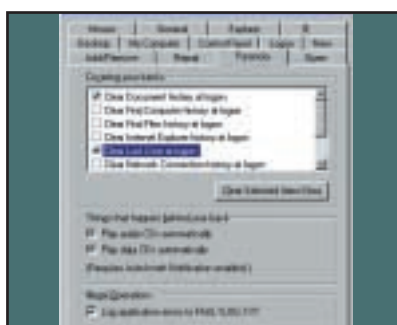
2 Once installed, TweakUI appears as an icon in Control Panel. It has 13 pages, and while we can't cover them all, we'll take a look at the most productive in terms of streamlining the Windows Interface. Starting with the Desktop tab, this lets you remove clutter from the Desktop – such as the icons for Network Neighborhood, the Recycle Bin and Internet Explorer – that can't be deleted in-place.



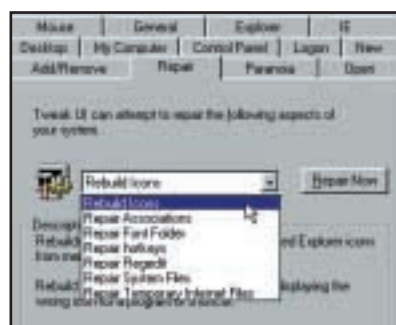
3 If you rarely use the right-click, 'New' feature because of the huge list of file types, but would like to keep it for a few types, then you can weed out the unwanted from the 'New' tab. For most types you can either temporarily disable the template type by unchecking the box, or permanently remove it: note that the latter will need a reinstall of the software to undo.



4 If you're sharing a computer with children, then the Control Panel and My Computer pages can be useful. In these you can hide Control Panel applets and entire drives from the user. You can also change the location of many of Windows' 'special' folders from here, such as Recent Documents, Program Files and Favourites: this can ease the pressure on a congested disk partition and make backup easier.



5 They know who you are, they know where you've been, and they know what you've been doing. TweakUI's Paranoia tab can be set to clear all those tell-tale lists, ranging from Internet Explorer History, through Recent Documents to the histories of the Run and Find Files command. You can either do this with one click 'on demand', or set Windows to clear the lists every time the computer is restarted or a different user logs on.



6 Although not strictly customisation, the Repair tab can often undo the effects of over-zealous meddling or sheer bad luck. A common problem, for example, is that the Font folder behaves like a normal folder and loses its 'Install Font' command, and another is that shortcuts and files display the wrong icons. TweakUI can repair these and several other problems.

Cursors and sounds

You're probably getting the hang of this now, so once you get to Control Panel, Mouse, Pointers, then hit Browse you'll see what's available. If that doesn't fire your rocket, then take a look at what's in the Windows Desktop Themes (see overleaf). Those with a creative urge will be pleased to learn that Axialis also publishes an animated cursor creator – see above for the URL. However, if you're content with the labours of other artists, you'll find loads on the web. Among

our favourites are the animated insects at www.members.home.net/wvseb/cursors.htm. There are also loads of cursors (and every other resource we've mentioned) at the Tucows site (www.tucows.com) where a cursory glance shows dragonflies, handguns and hot air balloons competing for your desktop pointing duties.

Be careful with changing your sounds. Most of us in the office would much rather have uninterrupted music while we work and have yet to find a sound scheme that didn't get irritating

QUICK TIP

Create a new folder in your Start Menu folder, and give it the name Control Panel.(21EC2020-3AEA-1069-A2DD-08002B30309D). The extension will disappear, and you'll get a cascading menu of all the Control Panel components.

Entering another dimension with Win3D



1 This workshop shows how you don't need any programming or artistic skills to have a slick, three-dimensional Windows shell. First, download Win3D from the Clockwise site (www.clockwise3d.com). You'll need Windows 95, 98, Me or 2000, a Pentium II 250MHz and a display adaptor with 16bit colour and hardware DirectX 6 support. Installation is straightforward, doesn't change your system files and you can return to vanilla Windows at any time.



2 You can move straight to a room by clicking on its entrance, or on the corresponding button on the navigator at the bottom of the screen. Alternatively, you can click the Move button on the navigator, and use the mouse and/or keyboard arrows to navigate as a free spirit in a virtual world. Now try right-clicking on anything: you'll be able to change the colour and sometimes other attributes such as the sky. Notice how the clouds and stars gradually move.



3 Let's move straight to the important stuff. The Games room will be pretty bare when you move in, as Win3D doesn't process your Start Menu, but notice how you can rotate the three bands to accommodate many more icons. The padlock gadget switches between rotating the bands together or separately. If you right-click on one of the three rotating bands, or on an existing icon, you'll get an elegant three-dimensional Add button that lets you add new icons.



7 Over on the other side of the Office is a stack of favourite folders. Once again, a right-click will customise both the contents and the appearance. There's a limit to the number of folders you can have here, but Windows Explorer is always available from the pull-out at the left of the navigator. Notice how the Win3D background fades into the background when you open a folder or a program.



8 This room is the multimedia headquarters, and you can add to the stack of programs at the left in the manner previously described. There are controls for Real Player here as well as volume and balance controls for CD, wav or MP3. If you click on the little CD and floppy disk you see in each room, they spin through the air before opening the appropriate drive.



9 At the right of the multimedia centre is your personal art gallery. Each block holds a picture thumbnail – once again, you right-click to assign images. Once your blocks are loaded, clicking on one shows the full image on the adjacent screen. A further bizarre touch is that you can smooth-scroll the images across the screen.

QUICK TIP

You don't have to put up with 'My Computer' – you can right-click and rename it. The new name will appear in Explorer, and the process also works for other 'My' folders such as 'My Documents'.

after a few days. But, if you insist, Control Panel, Sounds, is the place to go. As with cursors, you can change sounds by scheme or individually. Unsurprisingly there are vast volumes of sound samples available on the web, including hours and hours of copyright violations from your favourite films. Here's looking at you, kid.

Themes

When Windows 95 arrived, Microsoft also published the Plus! Pack, a £35 add-on

containing, among other things, co-ordinated Windows custom looks known as 'Themes'. These were later bundled free with Windows 98 and Millennium, and now look rather tired – especially the truly awful '60's USA' which can only be described as a tragic consequence of drug abuse. Nevertheless, there are high points (such as the Dangerous Creatures cursors) and the idea is a good one: themes encompass practically all the visually configurable bits of Windows, including cursors, icons, wallpaper, screensavers,



4 The Add button shown in the previous step leads to a straightforward file-browsing control. Note that it's much easier to pick the existing shortcuts out of the Start Menu, by navigating to the Windows\Start Menu\Programs folder, than it is to try and find the original program files for the games.



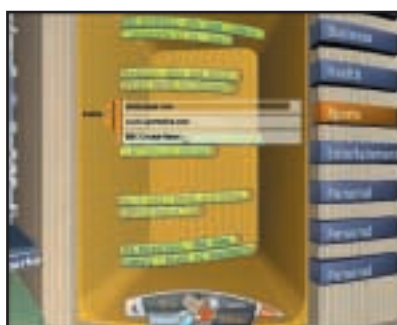
5 To work: once again, the Office is sparsely furnished when you first move in, though Win3D did find most of our Microsoft Office installation and lay it ready on the desk for us. Right-click on the pinboard behind the desk to create notes, and right click on the stack of blocks at the left of the desk to create shortcuts to other applications in the same way as in the Games room.



6 Here we've added a few more shortcuts, creating a second row of blocks. We've also been right-clicking on the walls to change the décor. The mysterious lid embedded in the floor leads to the recycle bin, and the stacked cabinets to the left of the applications open to reveal Control Panel settings. We've set the Autohide option on the Windows Taskbar. If you have trouble getting at it – as we sometimes did – press the Windows key on the keyboard.



10 The Internet room is really the star of the show. When connected you get a constant news banner scrolling around the top of the room: click on this to load the full story into your browser. To the left of the main screen is a running weather summary for your favourite cities, and to the right a seemingly un-customisable list of US sports results. Clicking on any of these brings details into the main screen. You also get access to your own mail client, or Win3D's free mail service.



11 To the right of the main screen is the news booth. Each category on the right opens a different section, pre-populated with stories preselected for you. You can, however, add your own sites or completely customise the unpopulated 'Personal' sections. Note that these don't replace your existing bookmarks or 'Favourites' that can be reached, as normal, through your browser or from a button in the centre section of the Internet room.



12 You've probably already guessed this is the shopping centre. All these goodies are actually animated, and will take you to vendors of flowers, books, CDs and so on. You will doubtless want to customise the destinations: the smart way to do this is not to type in URLs, but to browse to the site of your choice, then right-click on the appropriate icon and click the 'Get Current' and 'Get Name' buttons.

colours, fonts and sounds in one handy package. A Control Panel component gives one-stop access to all these aspects, and you can pick just the bits that you want. It's a perfect solution for those who'd like a new look without having to spend hours twiddling in various corners of Control Panel and other places.

Microsoft hasn't created much in the way of new themes since Plus, though there are a few available from the update site, including a retro-chic fashion theme. Third-party

themers, however, have not been idle. At www.themeworld.com you can find everything from an Alcoholics Anonymous theme to Aquarian Age Astrology, as well as *The Grinch*, *The Simpsons* and other popular copyright transgressions. At www.themeswindows.com/ they tend to concentrate on fantasy landscapes and women in bikinis, but there's a very fine Tutankhamun theme there as well. There are many, many more sites with free themes: if your interests lie in the spiritual and artistic, don't

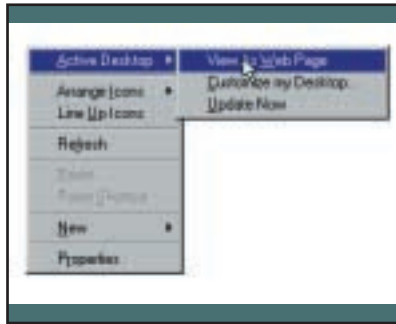
QUICK TIP

Not got an icon editor? Don't worry – when browsing for shortcut icons choose the 'All files' from the 'Type' box and you'll be able to point to any bmp file – Windows will create a correctly-sized icon from the file.

Using Active Desktop



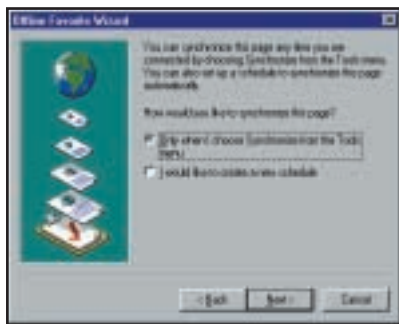
1 The Active Desktop converts your static desktop into a living container for all kinds of content. Here we have a bit of everything – live news, a clock, our favourite photographs, animated banners, a search engine and even a satellite tracker. Unlike conventional windows, Active Desktop items are always in the background and never obscure any folders or applications that you have open.



2 First, we need to do the obvious and turn on the Active Desktop. There are several ways of doing this, the simplest being to right-click on the desktop, select Active Desktop from the menu, then 'View as Web Page' in Windows 98 or 'Show web content' in Windows Me. If these commands are missing, then enable the Active Desktop from the IE page of TweakUI. One immediate benefit is that you can now use space-saving jpg or gif files as wallpaper instead of bmps.



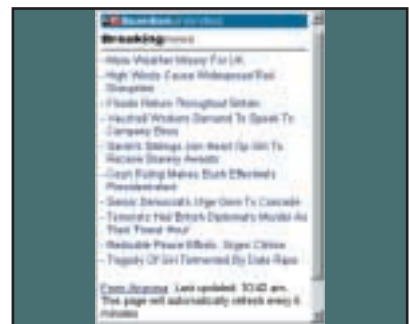
3 The next step is to right-click on the Desktop, choose Properties, then go to the Web tab. Click the New button, and you'll be invited to visit the Microsoft Active Desktop Gallery. Here you'll find a rather limited selection of items to add to your desktop, few of which are relevant to European users. We were especially unimpressed by Women's Wire news, which seemed to be permanently stuck in February 1998. Take heart – this is just practice.



7 The next screen will give you the option to either OK the item straight away, or add some options. If the site needs a password, then the Options route gives you the chance to add this. You also get choices on updating: you can update at regular intervals, on a schedule recommended by the site, or only when you manually synchronise. If you don't have permanent or unlimited Internet access, choose this last option.



8 Now you can use the techniques from step 4 to get the item positioned on the desktop as you want it. Here we've arranged it just to show the 'ticker' of the latest stories and the front-page headline. Clicking on either of these will open the full story in your default browser.



9 Other news sites have features that lend themselves better to this treatment. Shown here is the Guardian Unlimited/Ananova breaking news panel, which you can add to your desktop by going to www.guardianunlimited.co.uk and choosing 'Pop up headlines' from the news menu. The Times also has a 'News ticker' but this is a java applet that works independently of the Active Desktop.

QUICK TIP

People with sight, hearing or mobility problems should check out Windows Accessibility options (Control Panel, Add/Remove, Windows Setup), for high-visibility cursors, a magnifier and to change behaviour of keyboard, mouse and screen.

miss www.infonet.ee/arthemes/ where you can download Rubens accompanied, albeit somewhat anachronistically, by Mozart or the Sistine Chapel with Vivaldi.

The workshops

We've three workshops for you to try some serious interface experimenting. The emphasis in these is first on taking control and second on having fun. You don't need any programming knowledge or artistic skills to tackle any of these.

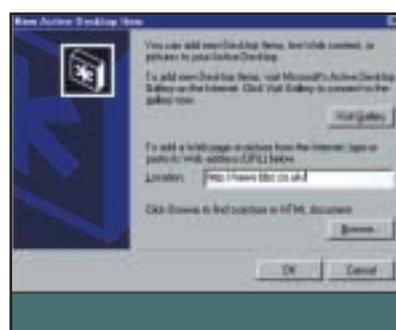
First we get to grips with the essential Windows toolkit, Microsoft's TweakUI. Next we take a look at a complete, ready-to-run three-dimensional shell replacement – Win3D. Finally we take a practical look at the Active Desktop. The Active Desktop first saw the light of day in Internet Explorer 4. This made several changes to the general Windows interface, blurring the distinction between the local Explorer and Internet Explorer, and became part of the operating system with the launch of Windows 98.



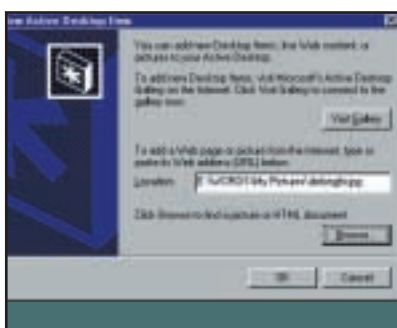
4 Having added an item to the desktop, it then appears in a borderless window. However, if you pass the mouse over it, you'll notice a blank title bar appears at the top. Grab this and you'll find you can move the content around. The small triangle at the left-hand end lets you synchronise the content, and careful mousing around the edges will also reveal a resizing frame. Windows Me users have an extra option to take the item full-screen.



5 You can remove items temporarily by unticking them from the Display Properties, Web dialog. You can permanently remove them with the delete button, and in the case of the US weather map and the Women's Wire site you'll probably want to. The tick/untick option does give considerable flexibility, but remember to click the Apply button if you want to continue with Display Properties still open.



6 Fortunately you are not limited to the items in the Gallery: you can enter any URL in the New Active Desktop dialog. Here we are going to get the BBC news on the desktop. If you are lazy, as we are, open the site in your browser and copy and paste the address from the browser's address bar.



10 Active Desktop content doesn't have to be online. With a little ingenuity, you can use your desktop as a photo album, for example, by adding a New Desktop Item and browsing to graphics files of your friends, family or favourite toaster. Unlike web pages, which reveal more or less of the page when you use the resizing handles, graphic files stretch or shrink to fit.



11 Just because the content is local, it doesn't have to be static. The way text below the picture is actually an animated gif banner that we made in Paint Shop Pro. As animation has yet to come to the printed version of *PCW*, you'll have to take our word that the text is waving around on the desktop with a transparent background.



12 The final touches – we've added a cool-to-the-point-of-unreadable Java clock from the Microsoft Gallery, and, rather more usefully, a quick entry to the Google search engine. To display your Active Desktop in all its awesome majesty, you can choose to hide those distracting icons. You can do this in Windows 98 from the Effects tab of Display Properties. In Windows Me, right click on the Desktop, Active Desktop, Show Desktop Icons.

The Active Desktop hasn't been the riotous success Microsoft hoped it might be. The much-vaunted 'Push' technology that brought live-content channels to the desktop soon lost momentum, the main and obvious reason being that most people don't want someone else's choice of content 'pushed' at them. The Active Desktop also failed to win hearts and minds on this side of the Atlantic, where free local phone calls and permanent Internet connections have been the exception. However, with the growth of

'always on' services such as ADSL or cable, and the somewhat erratic emergence of unlimited access dial-up deals, the Active Desktop technology may finally see its day. If dabbling in our Active Desktop workshop gives you a taste for that sort of thing, then there is a lot more you can do. There are plenty of ready-made Active Desktop themes available on the web, as well as applications such as calendars that make use of the Active Desktop. The really intrepid can also program their Desktop – and folders – in naked HTML.

QUICK TIP

Don't spoil that nice new wallpaper with unsightly icon label backgrounds. Go to www.bit-net.com/~jadamg/transparent/ and download the tiny freeware utility Transparent which gets rid of them.

DOWNLOAD



BUY



PLAY



INTERACTIVE COMMUNICATIONS

LOG ON

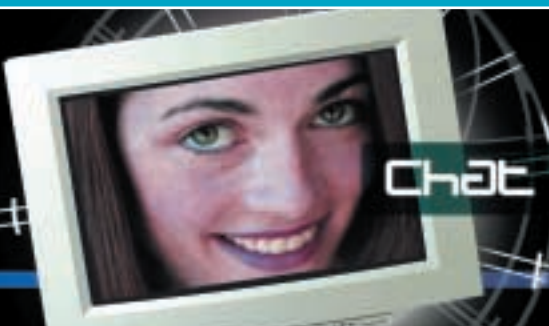
VIDEO

MUSIC

STREAMING MEDIA

INSTANT GRATIFICATION

THE LATEST KILLER APP ON THE NET, INSTANT MESSAGING, REDUCES EMAIL TO SNAIL MAIL AND IS SET TO REVOLUTIONISE EVERYDAY LIFE. JOHN RENNIE INVESTIGATES



CHAT



KILLER APPLICATIONS DON'T enjoy their place in the sun for long. It's not so long since we discovered that the upsurge in Internet usage wasn't going to be driven by the web but by email, with millions of us whiling away the hours exchanging jokes, trivia and the occasional memo.

Yes, we love to talk. But revolutionary though email has been, sometimes it's just not quick enough. Enter the new kid on the communications block: instant messaging (IM). You can chat with friends in real time, as long as they are logged on to the Internet. If emailing is the virtual equivalent of sending a letter, IM equates to a phone call. Messaging allows a dialogue, as messages bounce back and forth, rather than you opening an email, then composing a reply.

The way it works is that you go online and up pops your browser window in AIM, ICQ or whatever IM software you are using, with a list of who else is online from your personalised 'buddy' list of friends, co-workers, or those who you've identified as sharing your interests.

Your offline buddies will be listed too, and they'll pop up as soon as they log on. It brings even greater immediacy to Internet communications, as you feel an instant connection to buddies regardless of where they are in the world. You're already online and the urge to dash off a swift message is irresistible. Immediately, you begin to see why IM already has 30 million users in the US alone. That's up from fewer than one million two years ago.

ILLUSTRATION www.jacey.com

More than 40 per cent of web users now use IM. And at that rate of exponential growth, IM will soon leave email (90 million users worldwide at current estimates) trailing in its wake.

The business dream

But before we get carried away by the latest hyped comms toy, isn't IM the province of teenagers and office workers who want to while away the dull hours with meaningless chat? IM shares with SMS on mobile phones a reputation for instant and banal perishable communications – too transient even to fill an email.

It is this eagerness of consumers to adopt IM that's awakened the likes of Microsoft to the importance of grabbing a piece of the pie. IM is just so quick, easy and addictive. But you can be sure the industry doesn't see IM starting and ending with 'Did you watch the football last night?' or 'See you in the pub at 6.30'.

Voice messaging, streaming media, advertising messages, video and music, interactive television, and lots of potential revenue, are just a few of the things big business sees flowing down the wires in years to come. And with wires soon to be a thing of the past, we'll be able to get the messages wherever we go. IM can already carry voice over the net; messaging is set to be an integral feature of the new AOLTV convergent net/television service. Picture a world where viewers will not only be able to chat one-to-one or in online conferences

while watching their favourite programme, but can also respond in real time to targeted advertising messages, then you begin to see why the Internet giants are licking their lips.

Microsoft, however, has a more homely vision. The company has long foreseen the PC as the hidden governor in our homes – the intelligent Internet fridge is the popular image. Well, IM is going to be the medium used for your conversation with that home appliance. 'John, you're running low on semi-skimmed milk. Should I re-order?' flashes up on the IM window on your PDA. 'Yes' you reply. 'And while you're at it...' To Microsoft, IM will be the glue connecting every personal appliance.

The past

So where did this technology come from? Who made it and is it going to replace email? The original IM application, ICQ, was developed in Israel. Technology company Mirabilis came out of nowhere in 1996 with one of the Internet's most popular-ever downloads. By the time AOL paid \$287m (£190m) in cash for ICQ in June 1998, the service had signed up an astonishing 12 million users around the world.

Combining ICQ with its own successful proprietary service, AOL Instant Messaging (AIM), AOL immediately cornered 90 per cent of the market, a share that hasn't been much eroded since by competing IM services from Yahoo!, Excite, AT&T and Microsoft. AOL's bullish

The big hitters



ICQ
www.icq.com

With an estimated 60 million users, ICQ is on a different planet to most IM packages and, until we get interoperability, numbers are everything. ICQ gives no fewer than seven options for adding and finding chat partners and specific interest chat groups. In fact, beginners may find the complexity of ICQ a little confusing. It also makes it chunky at 5MB, and a painfully slow and slightly confusing download, though once done, an excellent web page tutorial talks you through the program.

Available for Windows 3.1 and above, Macintosh and a Java preview version for Linux. Also available on the Palm platform.



AOL Instant Messenger (AIM)

With 63 million users, AIM is the other big player. Now in version 4.3, AIM has a beautifully simple interface should you choose to run it standing alone on your desktop, firing up a separate news ticker. AIM is incorporated in later versions of the Netscape web browser (ever-hungry AOL having swallowed Netscape too). Version 4.1 has built-in voice capability, all you need is a microphone and speakers.

Available for the Mac and Windows 95 and above. There are versions of AIM for handhelds running Windows CE 2.0 or above, and for Pocket PC devices.



MSN Messenger
www.msn.com

Messenger has a mere five million users at present, but could be one of the more accessible services for beginners. It can be accessed from within Microsoft's Hotmail web email service and its Outlook Express email client. At the click of a mouse you can send music, photos or other files to any of your online contacts. Messenger also allows voice IM.

The simple interface rivals that of AIM, but curiously it doesn't support any version of Windows before 95, nor any handheld platforms at present, even Windows CE or Pocket PC. However, it does support Mac OS 8.0 and above.



Yahoo! Messenger
www.yahoo.com

A minnow by comparison to the other messengers here, with users in the low millions, Yahoo! Messenger has a number of features to recommend it. Yahoo! draws strongly on its background as a search engine and portal, with the first window you see when you fire it up being a headlined resumé of the day's news. It's also available for a broad span of platforms, including Windows 3.1 and up, MacOS 8.5 and above, Linux, Unix, WAP, Palm and Windows CE.

However, Yahoo! Messenger does have an annoying habit of embedding itself immovably in the address bar of your web browser.

Messaging wars

The one thing holding IM back from exploding is lack of a common standard – imagine if you could only phone people who used the same telephone company. The IM providers see future riches in a global IM system, and the lack of a standard is a big problem.

The early (and unofficial) moves to a standard started last year, and got dirty when Microsoft enabled its MSN Messenger customers to message AOL's Instant Messenger users. AOL, which trumpets the security credentials of AIM, set its programmers to designing a block. By the weekend, Microsoft's programmers had

beaten a path round it... and so it went on. This game of tit-for-tat continued until Microsoft withdrew. In the meantime, AOL had also been busy blocking AT&T's IM Here service and Tribal Voice.

This year, the Internet Engineering Task Force (IETF) has been working to come up with a standard. AOL signed up for the IETF programme along with the rest of the industry, although it's currently outside the camp working on its own proposals.

ISPs including AT&T, Excite@Home, Icast, Microsoft's MSN, Odigo, Phone.com, Prodigy Communications, Tribal Voice and Yahoo!, are all pushing

hard for a standard under the IMUnified banner.

Sceptics suggest that AOL's dawdling is less to do with security concerns and more with the fact that, with AIM and ICQ dwarfing the rest of the market with an estimated 123 million users, it is in no hurry to cede its 90 per cent market share. Microsoft, meanwhile, finds itself in the unhappy and unaccustomed position of being on the outside of a near monopoly.

To muddy the waters further, Jabber has been working to develop a fully interoperable IM technology. The Jabber hybrid is

backwards compatible with other IM networks, including AIM and ICQ, with Yahoo Messenger and MSN Messenger coming soon. You may have spotted the problem already: AOL spends much of its time blocking access to AIM and ICQ, so whether you can buddy up with AOL members depends on the state of the battle that day.

www.jabber.com
www.imunified.org
www.freeim.org

approach was all about instant critical mass – when there are a hundred proprietary brands on offer, but no industry standard, users gravitate to the service with the most users. As more people joined ICQ and AIM, they told their pals it was the place to be – word of mouth hastened wildfire 'viral' growth in classic net fashion.

Internet chat was nothing new in 1996. IM had been around since 1984 as a feature of bulletin boards for realtime, person-to-person communication. As early as 1988, AOL launched its own version of IM in the form of a 'buddy list' within its client software. Internet Relay Chat (IRC), meanwhile, emerged from Finland in the late 1980s, throwing the doors open wider still because, unlike older chat systems, it was not limited to just two participants.

However, by this time critical mass had not yet hit the web and as such IM was an idea whose time had not yet come. That time was to be the mid-1990s, as millions of us poured onto the Internet. Then, in November 1996, Israeli company Mirabilis pushed IM into the mainstream by introducing a free and easy-to-use Internet service that allowed users to 'network' themselves through realtime messages. It's this self-networking that is at the hub of IM. It relies first on the ability to see when another user is online – presence detection – and then on the ability of those users to engage in realtime conversation.

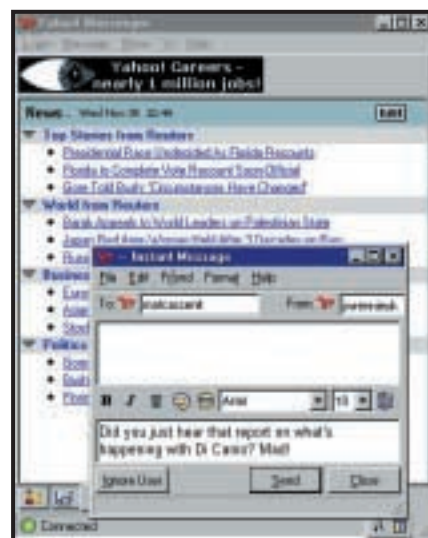
Big business is starting to get very excited about IM. The statistics and predictions start to boggle the mind, with predictions that the corporate market for this chat toy alone will grow from 5.5 million in 2000 to 180 million by 2004, with the number of messages

approaching two trillion a year.

Work, rest and play

Imagine how IM might impact on your daily life. Rather than arriving at Heathrow to find your flight delayed by three hours, you delay setting off, because BA has messaged you via your PC, PDA, laptop, phone or pager. It asks whether you wish to take a later flight and you confirm with a single click. Rather than making lots of phone calls (or not making them), the airline will be able to hit every passenger affected with a group message. Meanwhile, the check-in staff are messaged on your situation. Even better for the airline, if it has last-minute seats, it can hit customers on its frequent flyer buddy list with the opportunity to 'fly to Paris for £5'. We will use a pre-programmed menu of responses such as: 'Yes', 'No' and 'Stop bothering me.'

On the way to the airport you realise that you forgot to turn off the heating. No problem. Whip out your PDA, and message your thermostat. Maybe while you're away you want to keep an eye on your stock portfolio. Your online broker messages that Marks and Spencer shares have hit 500p, the pre-agreed limit at which you wanted to make a selling decision. You message back to 'Sell', or 'Call me again in four hours' if you're still unsure.



Although Yahoo! is overshadowed by its competitors the Yahoo! Messenger service draws heavily upon the company's background as a search engine

With all this excitement, you've completely forgotten that you're meant to be picking up little Damien from school tonight. You message your Car Pool buddy group, to see which of the other three parents can fill the breach. 'Click yes if you can.' All receive the message simultaneously, and so you avoid the endless relay of phone calls, parallel arrangements and confusions wasting everybody's time.

You arrive in Paris hungry and thirsty. No problem. The combined power of the GPS facility in your mobile phone, the enormous encyclopaedia that is the web and IM, now comes in to play. Message your personalised web portal with a request for urgent assistance. First, the GPS pinpoints exactly where you are on the planet. Second, your web portal flicks through your remembered preferences (*moules, frites* and lots of *bier*) and searches the web for the nearest restaurant that fits the bill. *Le Café des Anglais Ivres* is next on the left, and your portal fires off a message telling you your search is over.

Corporate applications

Back in the office, many companies see IM as an excellent internal communication tool: less cumbersome and more personal than a company-wide email system. Companies will build discrete buddy communities, not unlike the email groups we use now, but quicker. Ever tried brainstorming by email? You quickly need to arrange a face-to-face conference. Not any more. The speed of contributions building up in your messaging window, the ability of groups to participate rather than pairs of workers having a dialogue, the fact that this can be occurring in a corner of your screen while you free up your phone and the rest of your workstation for other tasks, make IM a seductive tool for ad hoc conferencing. Companies are salivating at the prospect of saving time and money and unleashing a wave of brainstorming creativity as new groups get together.

The future

In recent months, we have seen functionality added to raw chat – voice communications, realtime alerts from other information sources, video and music streaming, detection of others browsing the same web page, even detection of people actively receiving information about the presence of another user.

Voice is, of course, the next big thing for IM. Though adding 'Errmms' and 'Ahhhs' to its purity may seem as sensible as bolting a 17in monitor onto your PDA, the facility to single-button click into voice mode when conferencing needs to become more expansive, or conversations more personal, is a useful option. And for the companies themselves? Well, who needs to set up a telecoms company and spend billions on infrastructure and advertising when you've already got 120 million subscribers signed up

and just waiting to be hit with the message: 'Try our new voice service free. Dial worldwide at local rate!'

Internet telephony has had an unenviable reputation for jerky and irregular connection, but soon our voices will be surfing down the broad bandwidths of ADSL. With bandwidth problems being resolved, the industry has a pressing need to adopt an Internet telephony standard to catapult IM telephony into the mainstream. Big business wants it to happen – with offices in every country across the planet, the likes of Sony are rubbing their hands together at the prospect of its staff making all inter-office phone calls at local rate. And with the world's biggest and most lucrative interactive phone book in its hands, it looks like AOL (which has pegged its voice service onto Net2Phone software) could be taking this call.

So what else lies in the future for IM? Once we couldn't play our Beta videos on VHS players and there was no file-swapping between our Amstrads, Sinclair Spectrums and PCs. Technology history teaches us that for the market to grow a unified standard is needed. Whether AOL licenses its technology to other players, the US Government forces the giant to allow open access or the rest of the industry adopts a common standard remains to be seen. But happen it must. The swift take-up of email was, after all, largely down to the early adoption of the POP3/SMTP open standard.

In the meantime, smart opportunists such as Facetime Communications (www.facetime.com) are providing a unified business-to-business package. Want to find the most cost-effective supplier of 9mm widgets? Click onto the website and Facetime will search, source and then set up realtime communication and negotiation between you and your potential supplier, whichever messaging system the pair of you use.

We're likely to see some form of integration between existing messaging and email structures, and as the lines between mobile phones and PDAs blur, we're unlikely to see two messaging systems running in parallel, so expect some sort of consolidation of the mobile-phone-based SMS system and IM. Last January, Lotus released Sametime, an IM and realtime collaboration tool that meshes with its Notes email package. Microsoft, meanwhile, has a free, realtime collaboration tool called NetMeeting, offering text and voice chat and application sharing – pointing the way to a Microsoft acting as an application service provider (ASP) rather than a software vendor. Perhaps the greatest challenge – as the IT companies bolt on voice, video, file and application sharing and the rest – is that they don't bloat a slim, swift and simple technology beyond recognition.



SCIENTISTS DEVELOP NANO-SCALE MACHINE 50 YEARS AHEAD OF SCHEDULE

Molecular motors

MANY CRYSTAL-BALL GAZERS see the development of nanotechnology – building machines on the molecular scale – as a 21st Century breakthrough just waiting to happen. Around the world, researchers are steadily making advances in molecular manipulation, and US company Zyvex is boldly aiming to make molecular engineering a reality (www.zyvex.com). Now scientists at Cornell University have reported an exciting new development: they've built a working motor smaller than a bacterium.

Dr Carlo Montemagno, professor of agricultural and biological engineering at Cornell, and his colleagues, have made a biological motor by copying the way nature does it. 'It's the first true nano-scale machine,' said Montemagno (falcon.aben.cornell.edu).

Some kinds of bacteria have a tail called a flagellum that rotates and propels the bacterium along. In fact, such is the ingenuity and complexity of the flagellum's design, that it's been used as an argument against Darwinian evolution. Because the flagellum comprises three separate but interlocking sections, all useless without the presence of the others, anti-evolutionists say it's 'impossible' that step-by-step evolution could ever have resulted in such a mechanism. You can read an interesting discussion concerning this subject at www.arn.org/docs/behe/mb_mm/flagellum_all.html.

The nano-machine designed by the Cornell team uses a ubiquitous enzyme (a specialised kind of protein) called ATPase, which forms the flagellum motor. ATPase is made of two separate molecular complexes, called F0 and F1. The F0 part binds the enzyme to whatever substrate it's sitting on, and the F1 part is a cluster of molecular units with a hole in the centre, through which passes a shaft made of protein. The ATPase enzyme gets its power by converting adenosine triphosphate (ATP), the energy supplying molecule found in all cells, to adenosine diphosphate (ADP). When this chemical reaction occurs, the central protein shaft rotates, although the exact details of the specific mechanism are not yet fully understood.

To make a general-purpose motor from ATPase, Montemagno and his team took the F0 portion of the enzyme and attached it

to a microfabricated substrate of nickel. Then they attached to the top of the central shaft a genetically engineered 'propeller', made from a set of fluorescent protein filaments. When the modified enzyme was placed in a solution containing ATP, the machine worked for 40 minutes, with the propeller rotating three or four times per second. You can see a movie of the nanomachine – 100,000 times smaller than a grain of sand – at falcon.aben.cornell.edu/News2.htm.

Because the enzyme motor sits on a conducting substrate, in the future it may be possible to integrate the machine directly with a chip that could program the motor's activity before it's released into a cell.

Montemagno imagines creating nano-scale chemical factories inside cells that synthesise drugs and then use nanomotors to pump the drugs out wherever they're needed. This would solve one of the biggest difficulties of gene therapy – the delivery system. The challenge is to introduce curative DNA to cells with defective DNA without first alerting the body's immune system to the presence of the 'foreign' DNA, which it will then try to destroy.

One widely used method is to attach the DNA to an existing virus, which can hopefully sneak past the immune system and deliver its DNA. But unfortunately this doesn't always work, and can fail with disastrous consequences for the patient. Using nano-DNA factories and nano-pumps might, one day, provide a solution.

Montemagno is inspired by recent progress: 'For a technology that wasn't expected to produce a useful device before the year 2050, I think we've made a pretty good start'.

TOBY HOWARD





Speed merchants

As processor speeds continue to rise we challenged PC manufacturers to send us some fast systems – but speed isn't everything; we wanted some well-balanced PCs suitable for power users. So how did they fare?

With processor speeds continuing their inexorable rise, and graphics cards becoming ever more powerful, we thought this month we would place more emphasis on performance. That's not to say we wanted to see only a top-notch processor and graphics card, though. In fact, we were really looking for well-rounded systems featuring a good balance of components, all brought together in a well-built package suitable for any power user.

Bearing this in mind we sent out just a minimum specification to every top manufacturer, stipulating that the processor should be clocked at 1GHz or above and that this must be supported by at least 128MB of RAM. We wanted a hard drive with a capacity of 20GB or more, and at the very least a 17in monitor. In addition, we asked for a means of connecting to the Internet, a three-year parts and labour warranty and Microsoft's Windows Me operating system. And the asking price? £2,000 excluding VAT was our limit.

In all, 11 manufacturers responded with what can be described as an interesting collection of very fast systems. It seemed that the only common component was a CD-RW drive, and the price in particular was quite varied. It was clear, as you'll find out, that one processor manufacturer appears to be currently dominating the scene... but which one?

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• PCs tested by Lars-Goran Nilsson and reviewed by Jalal Werfalli

Atlas Meridian A1100 CW



UltraDMA100 Promise controller, takes care of data storage. And the Teac CD-RW will come in handy for backup purposes. Sitting above this is a 12-speed Hitachi DVD-ROM drive for data transfers and DVD movies, leaving one 5.25in bay free. This is becoming a fairly standard configuration.

Inside you only have two free PCI slots as the VideoLogic SonicFury sound card and ProLink TV tuner take up the other two dedicated slots.

ATLAS HAS OPTED for the ever popular Asus A7V motherboard and AMD's 1.1GHz Athlon. This is supported by 256MB of PC133 memory in the form of two modules. This leaves one slot free for future upgrades, although most users will find 256MB more than sufficient for some time yet. In this configuration, the Meridian climbs to a nippy SYSmark score of 194.

A 46.1GB IBM hard disk, fully compatible with the onboard

The shared PCI/AMR slot carries a Diamond 56K modem. Surprisingly Atlas hasn't used the USB backplate that comes with the A7V motherboard and so you're left with just the two onboard USB ports.

Sitting in the AGP slot is Hercules' 64MB 3D Prophet II Ultra, one of the fastest cards around. With the GPU galloping along at 250MHz, and the memory clocked at 458MHz, excellent scores of 4,313 in 3DMark and 70.6fps in

Quake III say it all. At the rear are a DVI output for digital flat panels and an S-Video socket. Married to the Ultra is CTX's PR960F 19in monitor – a very capable screen with a Sony FD Trinitron aperture-grille tube that has good contrast, minimal reflection and vivid colour representation. D-SUB BNC connectors and four downstream USB ports also boost the monitor's connectivity.

On the audio front, Atlas has gone for VideoLogic's SonicFury card and DigiTheatre LC arrangement, capable of producing Dolby Digital 5.1 sound. Software-wise, Microsoft's Works Suite 2000 and five games are included. A Logitech Wingman joystick and webcam top everything off.

DETAILS

PRICE £ 2,113.83 (£1,799 ex VAT)

CONTACT Atlas 07000 285 275

www.atlasplc.com

PROS Good-quality components; good 3D performance

CONS USB backplate not used

OVERALL A fast machine that matches the Time in overall performance

FEATURES

PERFORMANCE ★★★★★

VALUE FOR MONEY ★★★★★

OVERALL RATING ★★★★★



Compaq Presario 5WV296



by a somewhat modest 30GB Quantum Fireball hard drive, while an LG CED-8080B CR-RW drive and 12-speed Compaq DVD-ROM occupy both 5.25in bays.

Sound is handled by an integrated motherboard chipset and fed through a pair of JBL Platinum Series speakers. It's good to see the inclusion of two front-mounted USB ports, in addition to the two standard ports around the back. A Conexant HCF V.90 modem and an

THE PRESARIO'S CASE has an interesting style, with a front panel that drops open to reveal space to store several CDs. On the inside, the core is a 1GHz Athlon processor, coupled with 128MB of PC100 memory. Compared to the others on test this is a bit stingy and we would have preferred to have seen 256MB of PC133 memory instead, since the VIA KT133 chipset on the motherboard would be able to take full advantage of it. Storage is taken care of

Accton 10/100 network card occupy two of the three available PCI slots. However, some home consumers will have little use for this and may end up removing it to free up an additional PCI slot for other devices.

Based on nVidia's Riva TNT2 M64 Pro chipset, the graphics card lets the rest of the system down. This chipset just cannot compete with the likes of the Radeon and GeForce2-based cards in other systems on test. Given our

generous £2,000 price limit we were disappointed that Compaq supplied a card that performs so poorly. The review system came with a 17in monitor, but we have been informed by Compaq that a 19in model will ship with this package for the same price. We were unable to test the performance of this unit so we can't comment on the picture quality you can expect.

A copy of Microsoft Works Suite 2000 completes the package.

Given the rather mismatched set of components, we weren't too surprised to see the Presario finishing last in every one of our benchmark tests. On the whole, performance and specification could have been better.

DETAILS

PRICE £1,769.38 (£1,505 ex VAT)

CONTACT Compaq 0845 270 4000

www.compaq.co.uk

PROS Good build quality; front USB ports

CONS Poor performance

OVERALL A little more money spent on better-specified components could have made all the difference

FEATURES

PERFORMANCE ★★★

VALUE FOR MONEY ★★★

OVERALL RATING ★★★



Dell Dimension 4100 1000MHz



DELL IS ONE OF three manufacturers this month to opt for an Intel-based solution. A 1GHz Pentium III processor sits in the socket of a Dell-badged 815E motherboard and is backed up by a healthy 256MB of PC133 memory. A well-designed internal cooling system helps keep the temperature down inside the case but we did find the cabling rather untidy.

A 40GB Western Digital hard drive takes care of storage, along with an LG

CED-8080B CD-RW drive and a 12-speed Samsung DVD-ROM. In terms of performance, the Dell puts in a poor show, only managing to outperform the Compaq machine in the SYSmark tests.

A Turtle Beach PCI sound card is supplied and connected to a set of Altec Lansing ACS 340 loudspeakers. Connection to the Internet is taken care of by an Aztec V.90 modem that sits in a second PCI slot, leaving three slots free on the Dell

motherboard for additional devices. The 64MB nVidia GeForce2 Ultra graphics card provides solid 3D performance and is fitted with a DVI output for connection to a digital flat panel display. There is, though, no TV-out facility, which is a little disappointing given the quality of the card.

The 17in Dell monitor is a flat-screen model with aperture-grille design and has a well-focused and stable picture. The monitor will comfortably handle

resolutions of 1,600 x 1,200 at 75Hz, but for this kind of money we would have been happier with a 19in model such as those supplied by other manufacturers this month.

A copy of Microsoft Works Suite 2000 and a Microsoft USB keyboard fitted with two pass-through USB ports is included. However, we were surprised to see that Dell had supplied a standard PS/2 mouse instead of connecting a USB model to one of the free ports.

On the whole, the Dell offers a reasonable machine but it fails to shine in any particular area. The inclusion of a larger monitor would have given the PC some added appeal but it would still have been outgunned by the higher-clocked Athlons.

DETAILS

PRICE £1,936 (£1,648 ex VAT)

CONTACT Dell 0870 907 5664

www.dell.co.uk

PROS Quality graphics card; decent monitor

CONS Poor overall performance

OVERALL A decent set of components, but this machine fails to shine above the rest

FEATURES	★★★
PERFORMANCE	★★★
VALUE FOR MONEY	★★★
OVERALL RATING	★★★

evesham.com Origin 1200 DDR Ultra



THIS HAS ALL THE makings of a very fast machine. Under the lid is a 1.2GHz Athlon plugged into an Asus A7M266 motherboard. This board really unleashes the power of this Athlon as the AMD 761 North Bridge supports a 266MHz front-side bus (FSB), to match the processor. Together with the single 256MB stick of PC2100 DDR SDRAM this lifts the SYSmark score to 210 – the top spot.

The Origin 1200 is also at the top of

the 3D charts where 3D Power's GeForce2 Ultra scores 4,563 3DMarks and pumps out 74.2fps in Quake III. This is thanks to the hefty 64MB of DDR SDRAM and the 250MHz processor.

As far as output goes, you'll find only a D-SUB port, so a monitor is all you'll be able to connect. In this case it's a 19in Mitsubishi Diamond Plus 91 with an excellent Diamondtron NF aperture-grille display that's easy to look at for extended periods.

The hefty 60.5GB Maxtor hard drive is a relatively new model compliant with the UltraDMA100 standard, which is supported by the motherboard's chipset. This allows data transfer rates of up to 100Mbytes/sec between the drive and interface. The drive can be backed up to the Teac W512EB CD-RW – a BurnProof drive that allows you to multitask while writing at 12-speed and rewriting at 10-speed. For expansion, there's one 5.25in bay free, while the

other is filled by a Pioneer 16-speed DVD drive. Two 3.5in bays are empty.

Inside there is a Diamond PCI V.90 modem, while Creative's SoundBlaster Live! 5.1 Player card occupies another PCI slot, leaving two free. This sound solution is impressive and coupled with Creative's Desktop Theatre 5.1 DTT2200 speaker set, you can be sure of a quality, full surround-sound effect. An AMR slot is also present, but a USB plate with two extra ports blocks this.

Microsoft Works Suite 2000 is also included. At £1,749 ex VAT for a system that makes use of some of the latest technology, you can't go far wrong – a top-notch Editor's Choice.

DETAILS

PRICE £2,055.08 (£1,749 ex VAT)

CONTACT evesham.com

08707 28 70 70 www.evesham.com

PROS Blistering performance; quality monitor; large hard drive; BurnProof CD-RW

CONS At this price, none to speak of

OVERALL This machine simply oozes balance and speed – the cheetah of the PC kingdom

FEATURES	★★★★★
PERFORMANCE	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL RATING	★★★★★



Gateway Performance 1400



THIS IS THE ONLY system to feature a Pentium 4 processor. Running at 1.4GHz you would expect the Gateway to power its way to the top of the pile but, alas, this is not the case. We've had a look at other P4 machines recently that have completed our benchmarks, but Gateway's offering was unable to complete the SYSmark test, which is a shame as it would have been interesting to compare Intel's P4 to AMD's Athlon. It had no trouble producing 3D

scores, though, courtesy of the MSI GeForce2 GTS graphics card. A 3DMark score of 3,416 and 44.5fps in Quake III are in themselves reasonable and what you would expect of nVidia's GTS card. This graphics board comes with just a D-SUB port that's tethered by a non-captive cable to Gateway's own 19in EV910 monitor. This uses a shadow-mask tube with a very sharp and stable picture, but suffers from reflections bouncing off the curved screen. The fascia is also clean with access to the OSD controlled by a jog shuttle, hidden behind a flap on the front.

Inside the Pentium 4 is mounted on an Intel GB850 motherboard perhaps not surprisingly based on the Intel 850 chipset. This supports RDRAM of which there are four 64MB sticks filling all the memory slots. The motherboard has support for two extra USB ports and the UltraDMA100 standard, but while Gateway has used the first on the front

of the case, the latter has been shunned, as the 30GB Quantum hard drive is only UltraDMA66 ready. If you want to add extra drives, three out of the five 3.5in bays are spare, but the Philips CD-RW and 16-speed Panasonic DVD leave no 5.25in bays free. As for PCI slots, three are unoccupied for future additions.

The sound setup is not quite up to the standard set by other PCs here, as it uses Creative's lower-end SoundBlaster Live! Value card, which in this case doesn't have an external digital S/PDIF. This is disappointing as the three-piece Boston Acoustics speaker set needs this connection for digital sound, so only analog audio can be processed.

DETAILS

PRICE £2,312.40 (£1,968 ex VAT)

CONTACT Gateway 0800 552 000

www.gateway.com/uk

PROS Decent shadow-mask monitor: the only P4 machine here; front USB ports

CONS Analog sound; a bit expensive; no free memory slots

OVERALL Not a bad PC, but no SYSmark score means it can't be judged as a speed machine

FEATURES

PERFORMANCE (3D ONLY) ★★★★★

VALUE FOR MONEY ★★★★★

OVERALL RATING ★★★★★

Mesh Matrix 1100T



MESH HAS MADE A good stab at a performance machine with the 1100T, but sadly loses out in the all-important performance stakes. Even though it comes with a 1.1GHz Athlon, supported by a single 256MB stick of PC133 memory, the Matrix is just beaten by systems that offer higher clocked processors and faster graphics.

Yet again, both the processor and memory are mounted on the Asus A7V motherboard. This has a built-in

UltraDMA100 Promise controller that allows the 30.7GB IBM Deskstar hard drive to work at its full potential. For backup there's a Teac CD-W54E CD-RW drive and for copying on the fly or watching your favourite movies a 16-speed DVD-ROM drive is fitted. This leaves one 3.5in and a 5.25in bay empty and waiting to be filled.

As for graphics, there's an ATI Radeon in the AGP slot loaded with 64MB of DDR memory and sporting VIVO (video in/video out) capabilities. This is a fine card, with a 3DMark score of 3,189 and a Quake III rating of 45fps, but it couldn't quite match the performance of some other systems. Nonetheless the Radeon does help show off the excellent 19in Mitsubishi Diamond Pro 920 monitor.

Although this monitor is similar to the Plus 91 in styling and connectivity (restricted to D-SUB), there are some differences. First, the Pro 920 employs a unified grille pitch of 0.24mm, whereas

the Plus 91's pitch varies from 0.25 to 0.27mm. Second, the Pro 920 can operate at a refresh rate of 85Hz at an impressive 1,600 x 1,200 resolution.

Inside is a Conexant 56K PCI modem and Creative's SoundBlaster Live! 5.1 Player PCI sound card. The latter has onboard Dolby Digital 5.1 processing and produces rich surround sound through the Creative Desktop Theatre 5.1 DTT2200 speakers. Even with these cards there is some room for expansion. Two PCI slots and one shared PCI/AMR slot sit empty.

Only Mesh and Panrix have enabled the third port on the A7V's USB backplate, for those with several USB devices.

DETAILS

PRICE £1,761.33 (£1,499 ex VAT)

CONTACT Mesh Computers 020 8208 4706

www.meshcomputers.co.uk

PROS A good option for those with a smaller wallet; quality monitor; five USB ports

CONS Lacks the necessary performance to clinch an award

OVERALL A fine machine that just loses out on performance

FEATURES

PERFORMANCE ★★★★★

VALUE FOR MONEY ★★★★★

OVERALL RATING ★★★★★

NEC Direction SM-1000A



wins, largely due to its extra 100MHz of processor speed. As for Quake III and 3DMark, the results from both systems demonstrate how the Radeon, and the GeForce2 GTS chipsets are being surpassed by nVidia's GeForce2 Ultra. A Leadtek Winfast GeForce2 GTS card is fitted into the AGP slot of a microATX MSI MS-6340 motherboard that uses the VIA KT133 chipset. This 32MB graphics card also comes with an S-Video output that

NEC'S DIRECTION is the same price as the Mesh, and in terms of value for money there's little to separate them. Both have 256MB of PC133 memory, and where Mesh has offered a faster Athlon processor and a quality sound system, the Direction fights back with two 46.1GB hard drives, a range of peripherals (joystick, webcam, TV-tuner) and some extra software. However, there are some differences in performance. In SYSmark the Mesh

allows you to connect the card to a TV – ideal for watching DVDs. The monitor is a 19in NEC unit with a maximum flicker-free resolution of 1,600 x 1,200 at 85Hz, although most will find a less fine setting more appropriate. While the tube is not as flat as some in this group test and suffers from reflections, the picture itself is respectable and well focused. NEC has saved some money in the audio department as the SoundBlaster

Live! Value card (with CD S/PDIF port) and Labtec LCS-2632 speakers are not the most expensive. There is a single 256MB stick of PC133 memory, leaving one DIMM slot spare. There are only two PCI slots, which house the sound card and a Conexant modem. Expansion is also hindered by the fact that no 3.5in bays are free, although having two hard drives will be useful. Two 5.25in bays (one internal) are ready to be filled. An LG CED-8080B CD-RW and a 16-speed Pioneer DVD-115 handle optical storage. A handy USB port is also conveniently located to the front of the unit.

DETAILS

PRICE £1,761.33 (1,499 ex VAT)
CONTACT NEC Computers 0870 010 6322
www.nec-online.co.uk
PROS Large storage capacity; front-mounted USB port; extra peripherals
CONS Not the quickest; limited expansion; merely average sound
OVERALL A reasonable PC but it lacks speed and expandability

FEATURES	★★★★
PERFORMANCE	★★★★
VALUE FOR MONEY	★★★★★
OVERALL RATING	★★★★

Moore processing power?

In 1965, Gordon Moore, who at the time was the R&D director of Fairchild Semiconductors, made a bold prediction about the future of the microchip industry. Moore half-heartedly predicted that the number of electronic devices on a single microchip, and with it computing power, would roughly double every year. In 1975, Moore revised his hypothesis and estimated that the number of devices on a chip would double roughly every 18 months. At this time, the microchip industry was still in its infancy. This exponential increase in performance has since come to be known as Moore's Law, and it describes a trend that, remarkably, is still true today. Moore later went on to become co-founder of Intel and in 1971 the company introduced its first CPU, the 4004, which contained 2,300 transistors. In 1999, Intel's



Pentium III processor contained over 27 million transistors. Early versions of the Pentium III, and for that matter AMD's Athlon processor, were manufactured using a 0.25micron process. The latest models from both companies now employ a finer 0.18micron process and this is set to reduce even further over the next year. It may not be too long, though, before CPU growth starts to slow down.

Using a process called optical lithography, light is used to print the patterns of circuits onto a silicon wafer. Each time the manufacturer wants to achieve a finer manufacturing process the wavelength of the light has to be reduced. At the moment, UV light at a wavelength of 248nm is used but in the future this will be replaced by a newer technology known as Extreme Ultra Violet (EUV) lithography, which uses

an even shorter wavelength (10-14nm). This will mean that the manufacturing process should eventually reach the 0.07micron level with processors rated at 10GHz, debuting some time around 2005. It is believed that at this point silicon will have reached its maximum potential and a new chip substrate or a completely new method will have to be found. The increasing cost of manufacturing semiconductor chips may also play a major role in the growth of computing power. More elaborate and expensive fabrication plants will be needed, as chips become faster and more complex. The past 10 years have seen an increase in clock speeds, from the average 20MHz of a 386 to 1.5GHz in the form of the latest Pentium 4. However, we'll have to wait and see if this trend continues over the next decade.



Panrix Magnum 1100W



THE MOST INTERESTING aspect of the 1100W is the inclusion of an UltraDMA100 EIDE-RAID controller from Promise. There are a number of RAID types and Panrix has opted for striping (Level 0). Using this method increases disk throughput as the two 40.9GB Maxtor drives have independent roles – one is used for read and the other for write operations. This halves the access time resulting in a system that runs at an impressive speed. In addition, the

capacities are combined into one 80GB volume – plenty of room for applications and storage.

Panrix has used Asus' A7V motherboard with a 1.1GHz Athlon, backed by a single 256MB stick of PC133 memory. This arrangement produces some decent SYSmark scores keeping the Magnum among the top performers. A Hercules 3D Prophet II Ultra with 64MB of memory allows for some excellent 3D performance with 4,538 3DMarks and a Quake III

score of 73.8fps. The Hercules drives a 19in Mitsubishi Diamond Plus 91 monitor, whose aperture-grille tube gives a flat picture that's sharp, bright and comfortable to use.

The SoundBlaster Live! 5.1 handles audio well and comes with onboard Dolby Digital decoding. When connected to the bundled Creative Desktop Theatre 5.1 DT2200 speakers you can expect to hear true Dolby Digital 5.1 channel surround sound.

An HP CD-RW is included together with a 16-speed DVD drive from Pioneer. Two dedicated PCI slots remain free while two bays – one of each size – are also vacant. Finally, if you're worried about processor temperatures, then relax. The case comes with one of the biggest rear fans we've seen, which greatly contributes to the overall cooling of the processor and motherboard.

As for software, Panrix has bundled Microsoft Works Suite 2000, which includes a full copy of Word 2000, so you can be productive from the start. A speed machine worthy of a Highly Commended Award.

DETAILS

PRICE £2,348.83 (£1,999 ex VAT)

CONTACT Panrix 0113 244 4958

www.panrix.com

PROS RAID controller: great performance; excellent speaker system; cool case; all USB ports are usable

CONS A bit more expensive than others here

OVERALL The Panrix is one of the top performers in this group test and its sound system and build quality are excellent

FEATURES

PERFORMANCE ★★★★★

VALUE FOR MONEY ★★★★★

OVERALL RATING ★★★★★



Polar Pinnacle 1100



LIKE THE PANRIX, Atlas and Mesh, Polar's entrant features a 1.1GHz Athlon processor. This finds a home on an Asus A7V motherboard, complete with 256MB of PC100 memory. This time, though, the memory has been divided into two modules. This leaves one memory slot for future upgrades. With this arrangement the overall SYSmark score is a fairly average 187.

Housed in two of the four PCI slots you'll find a Diamond modem and

VideoLogic SonicFury sound card. The latter is identical to the US Turtle Beach card in the Dell system and differs only in its marketing. Needless to say, the sound produced by this combined with the VideoLogic DigiTheatre DTS speakers is excellent, with a quality purported to be even better than Dolby Digital as less signal compression is involved.

With USB devices becoming ever more popular it's a shame that the A7V's USB backing

plate was only partially connected, again leaving just two of the three ports functional. Polar is not alone in this oversight – Systemax and Time have done the same.

In the AGP socket there's a 32MB Hercules 3D Prophet II GTS card based on nVidia's GeForce2 chipset. This was once the hottest card on the market but now, as the 3D results show, the systems sporting Ultra cards from the same stable are clearly faster. Linked to this is

the same good-quality 19in Mitsubishi Diamond Plus 91 supplied by Panrix and evesham.com. Other components include a vertically mounted UltraDMA100 30.7GB IBM hard drive, a Hitachi 12-speed DVD-ROM drive, and a Delta OME-W141 CD-RW for burning backups. This leaves just three 3.5in bays available for expansion.

With relatively middle-of-the-road scores you may find yourself asking why the Pinnacle's price is so high. There's no RAID controller and no extra peripherals. The only real difference is the DTS sound system but for £500 less you could buy the Mesh or even the cheaper DDR system from evesham.com. At this price, it's difficult to recommend this fairly average setup.

DETAILS

PRICE £2,348.83 (£1,999 ex VAT)

CONTACT Polar Technology 0161 482 7000

www.polartechnology.com

PROS Good sound system and monitor

CONS Performance is only average

OVERALL A reasonable machine that is overpriced and doesn't really sparkle

FEATURES

PERFORMANCE ★★★

VALUE FOR MONEY ★★★

OVERALL RATING ★★★

Systemax P1000RV Lifestyle 0390



32MB GeForce2 GTS AGP card. This has S-Video output – handy for those who want to send its output to a television – but as far as speed goes it's a bit under-powered, beating only the TNT2 M64-based Compaq in both the 3DMark and Quake III tests. A 19in CTX PR960F completes the visual output setup.

The EIDE bus on the motherboard supports the UltraDMA100 standard and it's no surprise to see a compliant 40.9GB

THIS IS THE SECOND machine in this test to use the already outranked 1GHz Pentium III housed in an Intel 815E-based motherboard – the CUSL2 from Asus. With 256MB of PC133 memory occupying one of the three DIMM slots, you'd expect the P1000RV to be a fair performer, but like the Dell it finds itself hanging about the lower half of the SYSmark graph, with a score of 181.

This Socket 370 motherboard comes with an AGP Pro slot housing AOpen's

Maxtor hard drive connected to this channel for maximum efficiency. For removable storage requirements, a Plextor BurnProof CD-RW that writes at 12-speed and rewrites at 10-speed is slotted into one of three 5.25in bays. With another bay filled by a 16-speed slot-loading Pioneer DVD-ROM drive, one 5.25in bay is left free. For smaller devices, two 3.5in bays are also vacant.

There are six PCI slots, one of which shares a blanking plate with a CNR slot.

This sounds like a lot but you can only add one card without removing what's already in place. The occupied slots are home to a VideoLogic SonicFury sound card piping out to an excellent digital sound system in the shape of VideoLogic DigiTheatre LC speakers, and Hauppauge's WinTV DVB-S Digital Satellite TV Tuner. Finally, there's a standard Conexant 56K V.90 modem.

As well as two USB ports on the board itself, there is a backing plate mounting another three ports, but Systemax has not connected the third port to the motherboard. To top everything off Logitech's cordless keyboard and mouse, a webcam and gamepad are bundled.

DETAILS

PRICE £2,290.08 (£1,949 ex VAT)

CONTACT Simply 08707 297 366

www.simply.co.uk

PROS Lots of features; good monitor; BurnProof CD-RW; good audio setup

CONS Outperformed in this group test

OVERALL A great set of features and peripherals, but rather lethargic performance

FEATURES	★★★★
PERFORMANCE	★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★★

Time Machine 1200-7 VQ Pro



to eight drives. Finding somewhere to put them, though, would be a challenge as only two 3.5in and one 5.25in bays are free. Two of the EIDE channels meet the UltraDMA100 protocol and Time has connected a 46.1GB IBM hard disk to the primary connector.

Time has also fitted the extra optional USB backplate, bringing the USB port count to five. However, like the Polar, only four can be put to use, as the cable that connects the third port on

TIME HAS CERTAINLY fulfilled our criteria by supplying a machine built around a beefy 1.2GHz Athlon processor backed up by 256MB of PC133 memory. The latter comes as two 128MB modules, which leaves one slot free for memory upgrades.

The performance is impressive with an overall SYSmark score of 205. This is helped in no small part by the excellent Asus A7V motherboard that has four EIDE channels to allow connection of up

the plate has not been fitted.

You won't find any ISA slots onboard the A7V, but there is one shared PCI/ANR slot, and two PCI slots are free. Occupying the AGP slot is a Hercules 3D Prophet II GTS Pro card sporting 64MB of DDR SDRAM. This makes for some great scores in 3DMark and Quake III (3,619 and 51.3fps respectively), even though they are overshadowed by those from nVidia's Ultra card.

Samsung's SyncMaster 900NF monitor, with its 19in Mitsubishi Diamondtron aperture-grille flat screen, produces a vibrant picture that's both stable and in focus across its surface.

Audio is handled by Creative's SoundBlaster Live! 1024 card and FPS-1000 four-point surround speakers, while an Etech 56K PCI modem allows you to connect to the Internet. Bundled software includes Microsoft Works 2000, three decent software packs, and Microsoft's SideWinder Force Feedback joystick, steering wheel and pedals are also included. Don't expect too much from the Agfa CL18 camera, though.

DETAILS

PRICE £2,113.83 (£1,799 ex VAT)

CONTACT Time 01282 777 555

www.timecomputers.com

PROS Fast processor and graphics card; decent monitor; good price

CONS Fifth USB port not enabled

OVERALL Among its rivals Time has managed to put together a tidy system that performs admirably

FEATURES	★★★★
PERFORMANCE	★★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★★





How we did the tests

SYSmark 2000

This comprises 12 application workloads and a management program. The workloads are divided into two categories: office productivity and Internet content creation. We run the benchmark at a resolution of 1,024 x 768 in 16bit colour. It loops three times, rebooting between each workload.

It then assigns the system a performance rating for each application, based on a comparison of workload runtimes between the system being tested and a fixed calibration platform. A rating of 100 indicates the test system has performance equal to that of the calibration platform, 200 indicates twice the performance and so on. The calibration platform is based on a Pentium III 450MHz processor, an Intel 440BX chipset motherboard, 128MB of SDRAM, a 32MB Diamond Viper V770 Ultra graphics card, an IBM DJNA 371800 and Windows 98 SE.

Each category rating is a geometric mean of the workload ratings in that category. The overall rating is a weighted geometric mean of the category ratings.

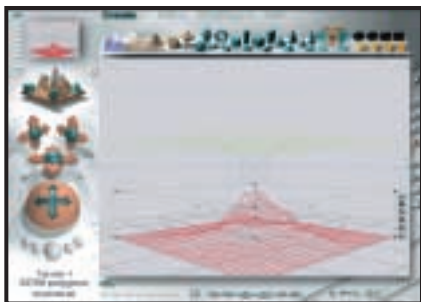
Office productivity

Corel CorelDraw 9.0

This script first takes an abstract design, applies an Art Stroke to it and runs various filter effects. It creates and manipulates a scene composed of vector graphics. Next, it takes a raster image and applies effects. It creates several 3D objects and performs 3D manipulations.

Corel Paradox 9.0

This performs SQL-style queries on a database table and runs a 'find duplicates' query. It imports other text files, formatting and exporting each to HTML. Then it opens up query forms, enters



Bryce 4 script manipulates a wire frame scene and renders it

charts, applying graphics and sound effects, and adding movie files.

additional data and produces reports based on queries.

Microsoft Word 2000

This workload invokes word processing functions, including editing, spell checking, search and replace, font change, copy and paste, print preview, mail merge fields, insert hyperlinks, background and table formatting plus opening and viewing HTML pages.

Microsoft Excel 2000

Operations include closing and opening spreadsheets, HTML pages and data in text files, spell checks, formula calculation, plotting data, formatting charts and cells, analysing data in pivot tables, naming a cell and inserting hyperlinks.

Microsoft PowerPoint 2000

Operations include spell checks, editing, formatting and moving pictures, applying templates, formatting tables in slides, inserting hyperlinks, applying header and footer data, formatting

3DMark 2000 tests each system's DirectX performance (above) and OpenGL performance is tested via Quake III: Arena (right)

Dragon NaturallySpeaking Preferred 4.0

The script plays a pre-recorded wav file into NaturallySpeaking, which then converts the wav file to text.

Netscape

Communicator 4.61

This opens a website of plays by Shakespeare and selects and loads the texts several times. Then it loads a page consisting of large tables, thumbnails and images and cycles through viewing the images.

Internet content creation

Adobe Premiere 5.1

This creates an animation of about 16 bmp files and other avi clips and puts transitions between them. It superimposes two audio tracks and runs the audio through filters.



Adobe Photoshop 5.5

The script loads, resizes, zooms out of images, applies filters to the images, changes mode and colour settings, adjusts image brightness and contrast and saves the image to a jpeg file.

Avid Elastic Reality 3.1

The workload sets up and renders a morph between two mpeg2-sized images (720 x 480 pixels, roughly 750KB).

MetaCreations Bryce 4

This script opens an assembled wire frame scene and renders it to the final image. Then a new image is opened and saved in Metastream format. Another image is opened and saved in an HTML-compatible format.

Microsoft Windows Media Encoder 4.0

The input file is an avi clip that is encoded using the mpeg4 Video Codec.

3DMark 2000

Remedy Entertainment's MAX-FX is used to test the DirectX performance of a system. It runs two specially coded games at low, medium and high resolutions. We ran the benchmark at 1,280 x 1,024 in 32bit colour, with each game set to loop three times. The 3DMark is calculated by adding the frames per second for each game together and multiplying the result by 12.

Quake III

We tested each system's OpenGL performance with Quake III: Arena (1.11).

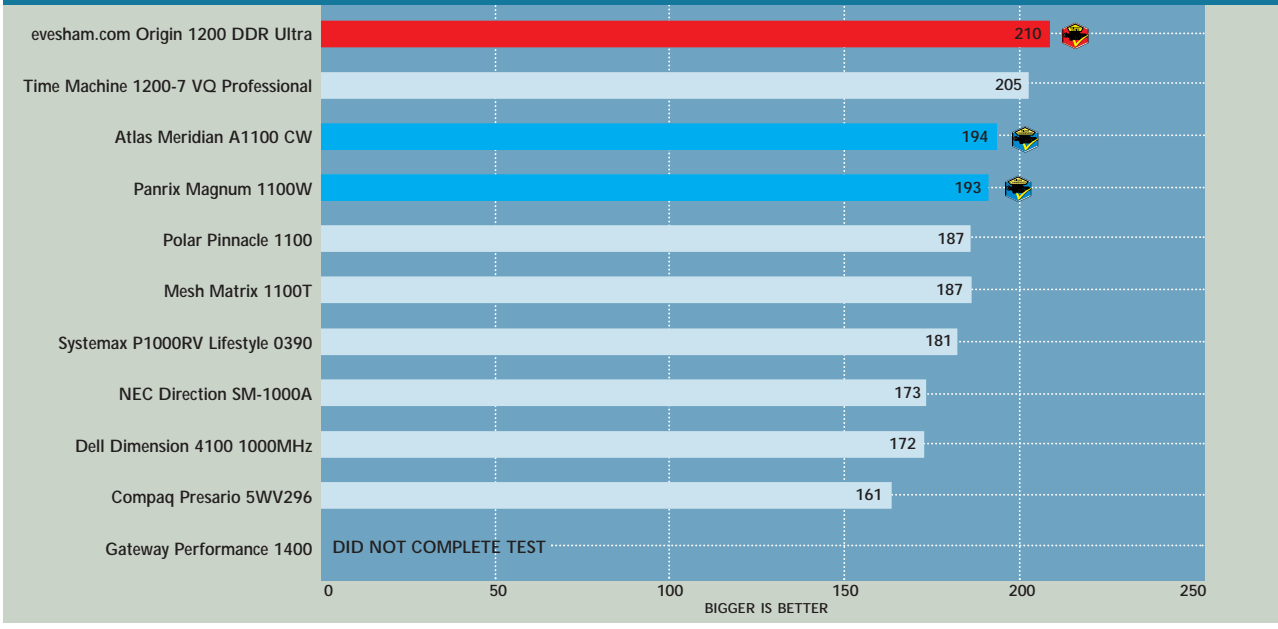
The settings were: video mode - 1,280 x 1,024, colour depth - 32bit, full screen, highest texture detail, texture quality - 32bit, texture filter - trilinear, lighting and lightmap.

At command prompt we typed:

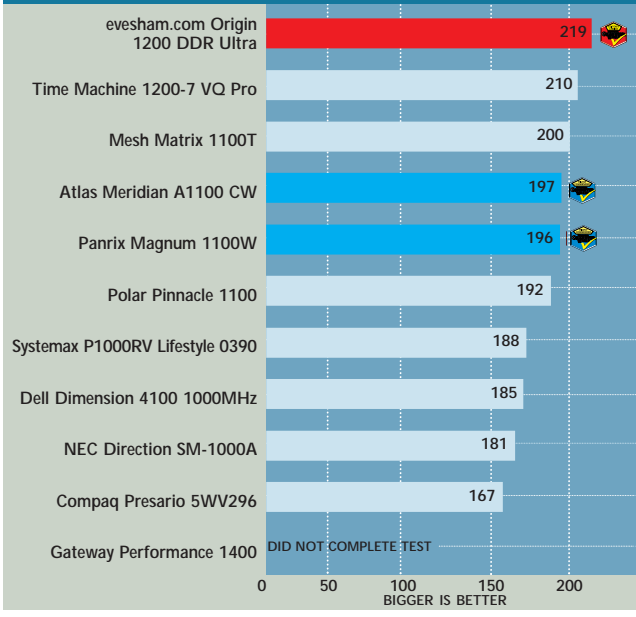
```
timedemo 1
demo demo001
```

This runs demo 1 and records the frames per second.

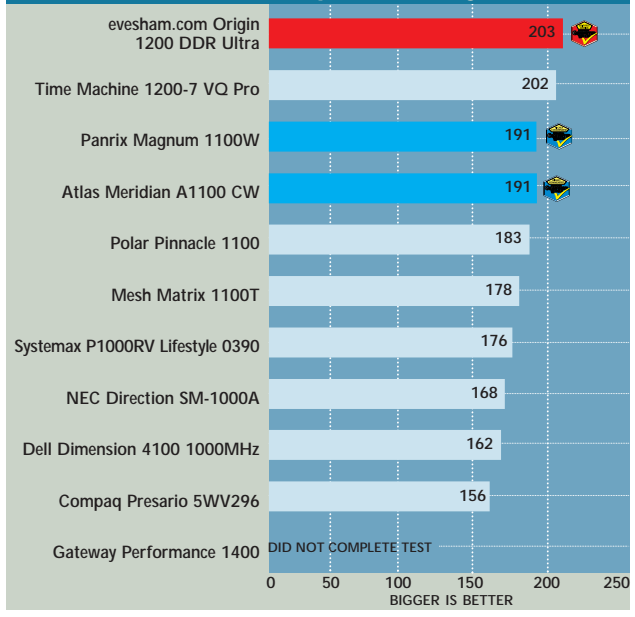
SYSmark 2000 overall



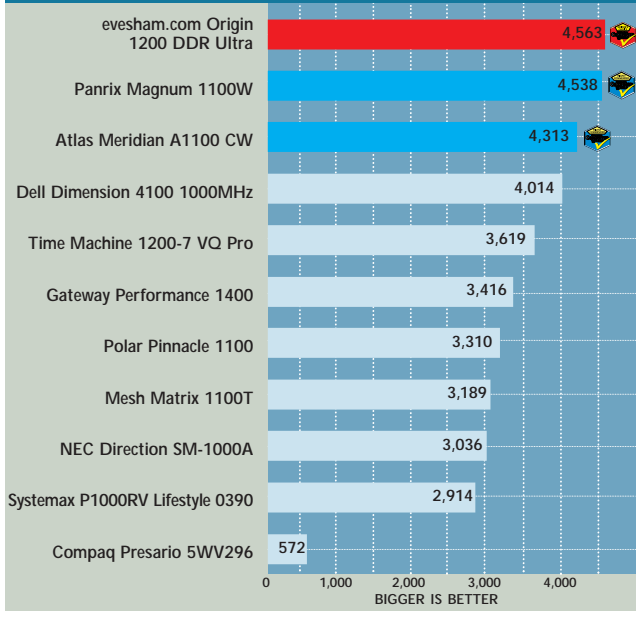
SYSmark 2000 Internet content creation



SYSmark 2000 office productivity



3DMark 2000 (1,280 x 1,024 at 32bit)



Quake III (fps) (1,280 x 1,024 at 32bit)

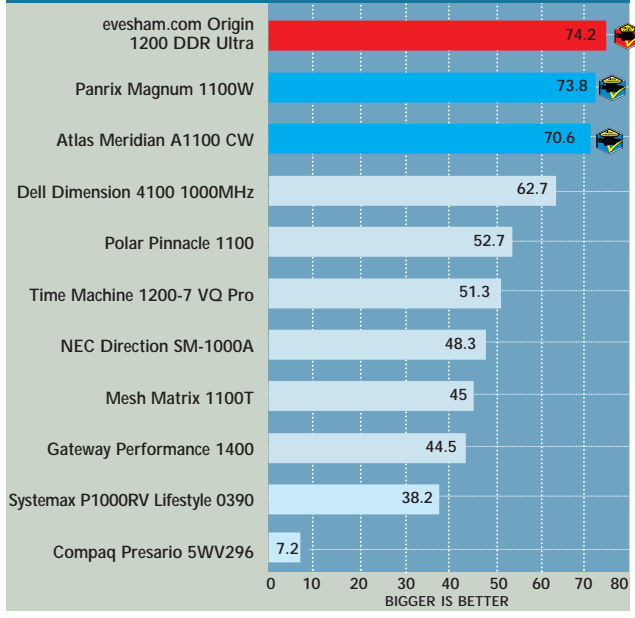








Table of features



MANUFACTURER	ATLAS	COMPAQ	DELL	EVESHAM.COM	GATEWAY
MODEL NAME	MERIDIAN A1100 CW	PRESARIO 5WV296	DELL DIMENSION 4100 1000MHZ	ORIGIN 1200 DDR ULTRA	PERFORMANCE 1400
Price inc VAT (ex VAT)	£2,113.83 (£1,799)	£1,769.38 (£1,505)	£1,936 (£1,648)	£2,055.08 (£1,749)	£2,312.40 (£1,968)
Telephone	07000 285 275	0845 270 4000	0870 907 5664	08707 28 70 70	0800 552 000
URL	www.atlaspc.com	www.compaq.co.uk	www.dell.co.uk	www.evesham.com	www.gateway.com/uk
HARDWARE SPECS					
Processor	Athlon 1.1GHz	Athlon 1GHz	Pentium III 1GHz	Athlon 1.2GHz	Pentium 4 1.4GHz
RAM/type	256MB/PC133	128MB/PC100	256MB/PC133	256MB/PC2100 DDR	4x64MB Rambus RDRAM/PC800
Occupied/spare RAM slots	1/2	1/2	1/1	1/1	4/0
Max memory in this configuration	1.28GB	1.15GB	512MB	768MB	256MB
Max mem supported by m'board	1.53GB	1.53GB	512MB	1GB	1GB
Hard disk (manufacturer/model)	IBM Deskstar DTLA-307045	Quantum Fireball Ict15	Western Digital Caviar WD400BB	Maxtor DiamondMax Plus 40 57060H6	Quantum Fireball LM30
HD size/interface	46.1GB/EIDE	30GB/EIDE	40GB/EIDE	60.5GB/EIDE	30GB/EIDE
Storage drive maker/model	Teac CD-W54E	LG CED-8080B	LG CED-8080B	Teac W512EB (BurnProof)	Philips CDD 4801 CD-RW
Size of storage drive media	650MB	650MB	650MB (1xCD-R, 1xCD-RW)	650MB (1xCD-R, 1xCD-RW)	650MB
MOTHERBOARD COMPONENTS					
Motherboard manufacturer	Asus	Compaq OEM	Dell OEM	Asus	Intel
Model/chipset	A7V/VIA KT133	UWave/VIA KT133	Intel/815E	A7M266/AMD761 & VIA686B	GB850(10A)/Intel 850
EXPANSION AND I/O					
No of 3.5/5.25in bays	4/3	4/2	5/2	4/3	5/2
No of free 3.5/5.25in bays	2/1	2/0	3/0	2/1	3/0
PCI/ISA/shared/AMR slots	4/0/1/0	3/0/0/0	5/0/0/0	4/0/1/0	4/0/1/0
Free PCI/ISA/shared/AMR slots	2/0/0/0	1/0/0/0	3/0/0/0	2/0/0/0	3/0/0/0
No of USB/serial/parallel/PS2	2/2/1/2	4/1/1/2	2/1/1/2	4/1/1/2	4/1/1/2
MULTIMEDIA					
DVD manufacturer/model	Hitachi/GD-7500	Compaq/SD-612B	Samsung/SD-612	Pioneer/DVD-115	Panasonic/SR-8586
DVD speed/interface	12x/EIDE	12x/EIDE	12x/EIDE	16x/EIDE	16x/EIDE
Sound card manufacturer	VideoLogic	SoundMax	Turtle Beach	Creative	Creative
Sound card model	SonicFury	Integrated Digital Audio	Santa Cruz	SoundBlaster Live! 5.1 Player	SoundBlaster Live! Value
Speakers (manufacturer/model)	VideoLogic DigiTheatre LC	JBL Platinum Series	Altec Lansing ACS 340	Creative Desktop Theatre 5.1 DTT2200	Boston Acoustics BA735
Graphics card manufacturer/model	Hercules 3D Prophet II Ultra	nVidia Riva TNT2 M64 Pro	nVidia GeForce2 Ultra	3D Power Ultimate GeForce2 Ultra	MSI MS-StarForce 815
Chipset	nVidia GeForce2 Ultra	nVidia Riva TNT2 M64 Pro	nVidia GeForce2 Ultra	nVidia GeForce2 Ultra	nVidia GeForce2 GTS
RAM and type	64MB DDR SDRAM	32MB SDRAM	64MB DDR SDRAM	64MB DDR SDRAM	32MB DDR SGRAM
Monitor manufacturer/model	CTX PR960F	Compaq MV940	Dell UltraScan P790	Mitsubishi Diamond Plus 91	Gateway EV910
Monitor size/max viewable diag	19in/18in	19in/18in	17in/16in	19in/18in	19in/18in
Max resolution at VESA refresh	1,600 x 1,200 at 85Hz	1,280 x 1,024 at 75Hz	1,600 x 1,200 at 75Hz	1,600 x 1,200 at 75Hz	1,600 x 1,200 at 75Hz
OTHER INFORMATION					
Modem manufacturer/model	Diamond SupraSST 56i Pro DF	Conexant HCF V.90 56K PCI	Aztec MDP3880-W (B) PCI 56K V.90	Diamond SupraSST 56i Pro DF	56K PCI Voice Modem SF-11561V+
Misc hardware	ProLink TV tuner, Logitech webcam and Wingman Extreme Digital 3D joystick	Accton EN 1207D PCI 10/100 network card, 2x front USB ports	USB keyboard with 2 ports		
Bundled software	MS Work Suite 2000, games bundle	MS Works Suite 2000	MS Works Suite 2000	MS Works Suite 2000	MS Works Suite 2000
Warranty (RTB = return to base C&R = collect and return)	3yrs on-site	1st yr on-site, plus 3yrs on-site Compaq Care Pack	1st yr on-site, 2yrs C&R	2yrs on-site, 3rd RTB	1st yr on-site, 2yrs RTB

					
MESH COMPUTERS	NEC COMPUTERS	PANRIX	POLAR TECHNOLOGY	SIMPLY COMPUTERS	TIME COMPUTERS
MATRIX 1100T	DIRECTION SM-1000A	MAGNUM 1100W	PINNACLE 1100	SYSTEMAX P1000RV LIFESTYLE 0390	TIME MACHINE 1200-7 VQ PROFESSIONAL
£1,761.33 (£1,499)	£1,761.33 (£1,499)	£2,348.83 (£1,999)	£2,348.83 (£1,999)	£2,290.08 (£1,949)	£2,113.83 (£1,799)
020 8208 4706	0870 010 6322	0113 244 4958	0161 482 7000	08707 297 366	01282 777 555
www.meshcomputers.co.uk	www.nec-online.co.uk	www.panrix.com	www.polartechnology.com	www.simply.co.uk	www.timecomputers.com
Athlon 1.1GHz	Athlon 1GHz	Athlon 1.1GHz	Athlon 1.1GHz	Pentium III 1GHz	Athlon 1.2GHz
256MB/PC133	256MB/PC133	256MB/PC133	256MB/PC100	256MB/PC133	256MB/PC133
1/2	1/1	1/2	2/1	1/2	2/1
1.28GB	768	1.28GB	768MB	512MB	768MB
1.53GB	1GB	1.53GB	1.53GB	512MB	1.58GB
IBM Deskstar DTLA-307030	2 x NEC Telesio (IBM Deskstar DTLA -307045)	Maxtor DiamondMax Plus 40 54098H8	IBM Deskstar DTLA-307030	Maxtor DiamondMax Plus 40 54098H8	IBM Deskstar DTLA-307045
30.7GB/EIDE	46.1GB/EIDE	2x 40.9GB/EIDE (RAID ctrlr)	30.7GB/EIDE	40.9GB/EIDE	46.1GB/EIDE
Teac CD-W54E	LG CED-8080B	HP 9150i	Delta OME-W141 (CD-RW)	Plextor 12/10/32A Burnproof	LG CED-8080B
650MB	650MB	650MB (1xCD-R)	650MB	650MB (1xCD-R, 1xCD-RW)	650MB
Asus	MSI	Asus	Asus	Asus	Asus
A7V/VIA KT133	MS-6340/VIA KT133	A7V/VIA KT133	A7V/VIA KT133	CUSL2/815E	A7V/VIA KT133
3/3	2/5	4/3	5/2	4/3	4/3
1/1	0/2	1/1	3/0	2/1	2/1
4/0/1/0	2/0/1/0	4/0/1/0	4/0/1/0	5/0/1/1	4/0/1/0
2/0/1/0	0/0/1/0	2/0/0/0	2/0/1/0	1/0/1/1	2/0/1/0
5/2/1/2	3/2/1/2	5/2/1/2	4(5)/2/1/2	4(5)/1/1/2	4(5)/2/1/2
Pioneer/DVD-115	Pioneer/DVD-115	Pioneer/DVD-105s	Hitachi/GD-7500	Pioneer/DVD-105s	Pioneer/DVD-105s
16x/EIDE	16x/EIDE	16x/EIDE	12x/EIDE	16x/EIDE	16x/EIDE
Creative	Creative	Creative	VideoLogic	VideoLogic	Creative
SoundBlaster Live! 5.1 Player	SoundBlaster Live! Value	SoundBlaster Live! 5.1 Player	SonicFury	SonicFury	SoundBlaster Live! 1024
Creative Desktop Theatre 5.1 DTT2200	Labtec LCS-2632	Creative Desktop Theatre 5.1 DTT2200	VideoLogic DigiTheatre DTS	VideoLogic DigiTheatre LC	Creative FPS-1000
ATI Radeon 64MB DDR VIVO	Leadtek Winfast GeForce2 GTS	Hercules 3D Prophet II Ultra	Hercules 3D Prophet II GTS	AOpen GeForce2 GTS	Hercules 3D Prophet II GTS Pro
Radeon	nVidia GeForce2 GTS	nVidia GeForce2 Ultra	nVidia GeForce2 GTS	nVidia GeForce2 GTS	nVidia GeForce2 GTS Pro
64MB DDR SDRAM	32MB DDR SGRAM	64MB DDR SDRAM	32MB DDR SGRAM	32MB DDR SGRAM	64MB DDR SDRAM
Mitsubishi Diamond Pro 920	NEC VR19	Mitsubishi Diamond Plus 91	Mitsubishi Diamond Plus 91	CTX PR960F	Samsung SyncMaster 900NF
19in/18in	19in/18in	19in/18in	19in/18in	19in/18in	19in/18in
1,600 x 1,200 at 85Hz	1,600 x 1,200 at 85Hz	1,600 x 1,200 at 75Hz	1,600 x 1,200 at 75Hz	1,600 x 1,200 at 85Hz	1,600 x 1,200 at 85Hz
Conexant HCF V.90 56K PCI	Conexant soft K56	Diamond Supra Express 56i Pro VCC	Diamond SupraSST 56i Pro DF	Conexant HCF PCI	Etech 56k PCI modem PCI 56 MRXV
	Logitech Wingman Extreme Digital 3D joystick & USB webcam, Hauppauge WinTV USB	Promise Fast Trak UltraDMA100 RAID controller		Happauge WinTV DVB-S Digital Satellite TV tuner, Creative Webcam Go Plus, MS SideWinder Freestyle Pro	MS Force Feedback Pro joystick, headset mic, Agfa digital camera, SideWinder Force Feedback steering wheel
MS Works Suite 2000	Multimedia software pack, MS Works Suite 2000, 4 games	MS Works Suite 2000	MS Works Suite 2000	Lotus Smartsuite Millennium, games bundle	MS Works 2000, Standard, Exec and Premium software
1st yr on-site, 2yrs RTB	3yrs on-site (parts and labour)	1st yr on-site, 2yrs RTB	3yrs on-site	3yrs on-site	3yrs C&R



Editor's Choice

It was pretty evident early on in this group test that the contenders were going to adopt one of two approaches, with some going for all out speed, while rest seemed a little more concerned with how many peripherals they were able to bundle with the PC.

What was interesting was the dominance of AMD with all but three systems sporting a processor from the company. Out of those three, two opted for Pentium IIIs and one chose the cutting-edge Pentium 4. In addition, Asus was very well represented with its DDR A7M266, CUSL2 and A7V motherboards present, the latter in no fewer than five of the 11 PCs.

On the graphics front, nVidia's GeForce2 chipset was clearly most suppliers' favourite, and was present in most of the offerings in its Ultra, Pro or GTS form. The amount of memory installed on the motherboard is always an influence on the overall speed of a system, and at this price point 256MB of PC133 memory was the *de facto* standard. It was therefore a surprise that the Compaq machine came with only 128MB.

Although it wasn't requested in our original invitation, it was nonetheless pleasing to see that every manufacturer chose to go with a means of removable storage. No Zip drives this time – the decision to opt for the humble CD-RW was unanimous. Some manufacturers even went for BurnProof drives that allow the user to make backups while completing other jobs.

Enhancing the variety, many systems

came with full Dolby Digital 5.1 surround sound capabilities, making a PC-based home cinema/music centre a real prospect. Hard drives also appeared at all sizes ranging from 30.7GB to an 80GB RAID system.

Ultimately, the decision had to come down to who could best combine top performance with a decent blend of quality components, while remaining below the £2,000 ex VAT ceiling.

The winners

If speed is your ultimate goal, then you should look no further than the machine submitted by evesham.com. Winner of this month's overall **Editor's Choice** award, the **Origin 1200 DDR Ultra** also qualifies as the best all-rounder on test. With its Athlon processor clocked to an impressive 1.2GHz most of the competition was behind right from the start. Add to this the fact that the 256MB of PC2100 memory, and the processor, each run on the 266MHz FSB on the motherboard, and you're bound to have a system that shifts.

But it's not only about all-out speed, and evesham.com has really gone to town with supporting components. For starters the hard drive is a massive 60.5GB, and it's compatible with the UltraDMA100 standard. This can be backed up to CD while you work – with the help of the BurnProof Teac CD-RW. The GeForce2 Ultra coupled with the excellent 19in Diamond Plus 91 monitor can only be described as one of the best graphics solutions around. The sound system is also splendid offering true

Dolby Digital 5.1 surround sound. While other machines did come with similar components we believe that evesham.com's Origin has struck the right balance, and for £1,749 ex VAT you can't really argue.

Hot on its heels and winner of our first **Highly Commended** award comes the **Panrix Magnum 1100W**. What we liked about this system was the way it's been put together. It's a little more expensive than some but what you get for your money is a tidy system with a great case, ideal for cooling down today's hot processors. The 1.1GHz Athlon, 256MB of memory, and GeForce2 Ultra worked well together to put in a great performance in each benchmark. It also boasts a massive 80GB RAID array, that not only operates more efficiently, but will future-proof the system for some time to come. The monitor and sound system are the same quality products as in the Origin system.

Deciding on the final **Highly Commended** system proved to be the trickiest part of the test as the submissions from Time, Mesh and Atlas all proved to be worthy candidates. In the end the award had to go to the **Atlas Meridian A1100 CW** as it managed to eke out every last Hz from the 1.1GHz Athlon processor. So much so that it rivalled the faster 1.2GHz in the Time machine. As for 3D performance, the 64MB Hercules 3D Prophet lifted the Atlas Meridian to third place and with a decent price of £1,799 ex VAT the extra peripherals that the Atlas comes with make it even better value for money.



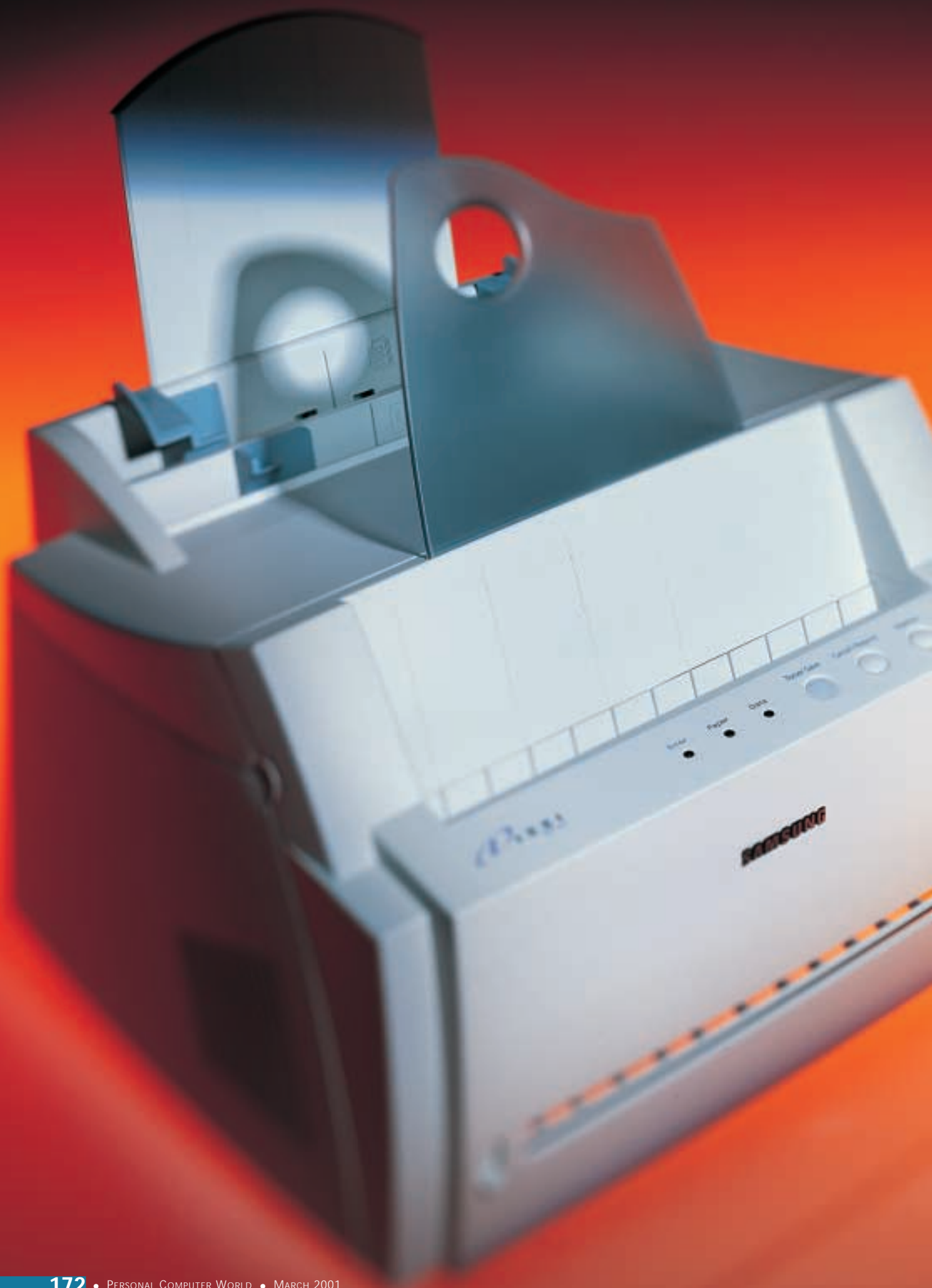
evesham.com's Origin was the best all-rounder in terms of speed and components



Panrix is more expensive than others but you get a good system – and a RAID array



Atlas rivalled the faster 1.2GHz Time Machine and has great 3D performance



The fine print

If you're after laser-quality reproduction from your printer but worry about the expense, then look no further as we put 10 entry-level offerings through their paces

Laser printers are very much the unsung heroes of computing. Without them, the usefulness of PCs diminishes rapidly, while the paperless office remains a far-off dream as we print ever more, not fewer, pages. Laser printing is still the dominant technology and the speed and quality advantages it enjoys over inkjet technology are well known. Unfortunately, size and price have, so far, deterred the home and small-office user from buying laser printers, but that's about to change – the latest generation of entry-level lasers have shrunk, in both respects.

If you print a lot of colour documents or photos, and not a lot of text, you probably won't want to part with your inkjet as it is more than capable of producing high-quality text anyway. But if you've ever stood in front of an inkjet waiting for a 20-page document to emerge or taken a close look at the letters on the page, you'll understand why laser is better. If you print lots of text-heavy documents and you want razor-sharp output, you need a laser.

Lasers have other benefits as well, such as cheaper consumables. A toner cartridge may cost double that of an inkjet refill but it lasts longer. This translates to a cost per page of between 1 to 2p for the laser and up to 6p for the inkjet.

So this month our second group test is devoted to this class of laser printer. It covers 10 entry-level laser printers, the sort that would be purchased by home or small-office users, but are still capable of being shared by a handful of users. We set a price ceiling of £500, a target that all the models achieved easily.

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• *Laser printers tested and reviewed by Roger Gann*

Brother HL-1250



its heavy-duty cycle promises trouble-free day-to-day operation.

For its speed, the HL-1250 is relatively compact, comes with a big paper tray as standard and offers a better than average resolution of 600 x 1,200dpi. It has low running costs of about 1.2p per page but the printer lies at the dearer end of our price spectrum.

The HL-1250 comes with 4MB of RAM, expandable to 36MB.

ALTHOUGH BROTHER markets the HL-1250 as a 'family device' its specification makes it even more suitable for small offices that require an inexpensive, reliable workhorse. It can, for example, take an optional 250-sheet second paper tray, which is a boon for business users but less helpful at home. A replacement for the popular HL-1000, the HL-1250 connects to parallel or USB ports and will work on PCs and Macs. It lacks any internal network capability but

This high spec didn't translate into noticeably better-looking output – it was pretty good, with well-formed type, while our greyscale image had good contrast and definition, though with a hint of banding. It's a 12ppm printer and produced the first page of text in 15 seconds.

Its output speed was pretty much as promised both on text and graphics, though it was a trifle weak when it came to printing out the PowerPoint

slideshow. In use, it was noisier than other printers.

The HL-1250 is easy enough to get up and running – as is the norm these days, you get a 'quick-start' poster to walk you through the basics of setting it up and the more detailed stuff is supplied in the form of an online manual in pdf format on the CD-ROM. Ergonomically, the HL-1250 is a mixed bag – it has slightly awkwardly located status LEDs and a push button mounted on the front panel, rather than on the top of the printer, where they are more easily accessible. Conversely, the manual/envelope feed is located on the front edge, which is more convenient.

The HL-1250 comes with DOS, Mac and Windows drivers, plus manual duplexing, which is rare for this price.

DETAILS



PRICE £316.08 (£269 ex VAT)

CONTACT Brother 0845 606 0626

www.brother.co.uk

PROS Fast; reasonably priced; cheap to run
CONS Rag-bag printer software clutters your desktop

OVERALL The HL-1250 is yet another decent printer offering from Brother – for a 12ppm printer it's pretty cheap

Canon LBP 800



identical specification too and, bar a few notches on the toner cartridges, you could swap them without much trouble. But the similarities end there – the LBP 800 lacks any external controls and apart from a status LED, it's a plain looking device.

Another big difference relates to cost – the LBP 800 is half the price of the LaserJet 1100, while its toner and running costs are two-thirds the price. Speed-wise it bettered the

NOT AS CHEAP AS

the QMS Minolta or the Samsung printers in this group test, this 8ppm printer still offers very good value for money. It's a compact 600dpi unit, with a vertical paper tray to the rear and a similar vertical output tray at the front. As far as I/O goes, the LBP 800 only has a bi-directional parallel port.

Externally, the LBP 800 looks like it was separated at birth from the near-identical HP LaserJet 1100. It has a near-

LaserJet 1100 on graphics, which is a tribute to the CAPT driver software as the LBP 800 has a meagre 512KB of RAM, compared to the LaserJet 1100's 2MB. This didn't prevent it from delivering print speeds close to its claimed 8ppm – 7.81ppm and 7.52ppm on the Acrobat and Word tests respectively.

Setting up the LBP 800 took just a few minutes, installing the drivers and the online user's guide. The Windows driver is sound-enabled, which means

you're 'told' when printing has started (as if you didn't know) and when it has stopped. You either love or hate this sort of thing and if you fall into the latter camp, you can switch the feature off. Status feedback is provided, which is useful on long print runs – you can actually see the progress of each page through the printer as an animated graphic.

Another potentially useful utility is the troubleshooting functionality. Feature-wise, the Canon driver is a little simpler than its rivals, with slightly fewer options. You'll still find the most important ones here, though, such as overlays, multiple page printing and graphics control.

DETAILS



PRICE £209 (£177.87 ex VAT)

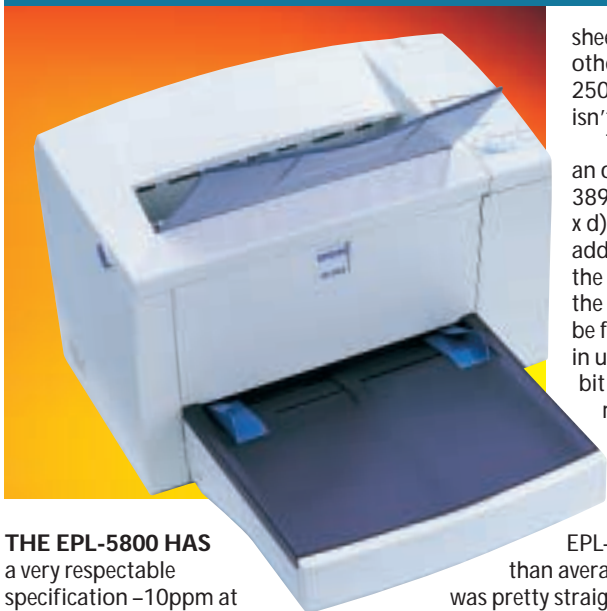
CONTACT Canon 0500 246 246

www.canon.co.uk

PROS Attractive price; low running costs; easy-to-use driver
CONS Limited expansion options; modest paper handling

OVERALL Given a choice between this and the LaserJet 1100 there's no competition – the LBP 800 is essentially the same and yet is much cheaper

Epson EPL-5800



THE EPL-5800 HAS

a very respectable specification – 10ppm at 1,200dpi with both parallel and USB and no less than 16MB of RAM, but it is a little pricey. Windows and Macintosh drivers come as standard, as does PCL 5e and PCL6, while PostScript Level 3 is available as an optional extra.

However, the paper handling isn't exceptional; the EPL-5800 has a 150-

sheet tray while several other printers boasted 250sheets. Networking isn't an option either.

The machine itself has an odd form factor, at 389 x 310 x 240mm (w x h x d), but the paper tray adds another 170mm to the depth and, as it's of the cassette variety, can't be folded away when not in use, so it takes up a fair bit of desk-space. It has a rather 'traditional' look, following Epson's conservative house style.

In use the EPL-5800 proved quieter than average. Installation was pretty straightforward and Epson's excellent manual means that this process shouldn't take longer than a few minutes.

The driver itself also has full online help and is relatively easy to use with a good range of features. In particular the status monitor usefully indicates paper and toner life, something no other printer did.

The EPL-5800 is a bit unusual in offering true 1,200dpi and 1,200dpi 'class' printing. However, the former resolution imposes a severe hit on performance and for text printing it's hard to justify using this setting.

Even at 600dpi it was possible to discern every single character printed at 1pt, which is pretty damn sharp – none of the other printers in this group test were able to match that. Graphics didn't seem to benefit much from this – the default was a trifle dark with a hint of thin banding.

The EPL-5800 didn't disappoint on the text printing test, returning times over the stated 10ppm but, despite having a fast 133MHz RISC processor, its graphics printing speed was less stellar, returning about 6ppm, which is a little less than we would have hoped or expected.

DETAILS

★★★★



PRICE £374.83 (£319 ex VAT)

CONTACT Epson 01442 611 144

www.epson.co.uk

PROS Great text quality; well specified; fast

CONS Weak graphics performance

OVERALL The EPL-5800 is a better than average printer with a higher than average price

HP LaserJet 1100



HP'S ENTRY-LEVEL LaserJet, the 8ppm 1100 seems like a welcome addition to small- and home-office users who want speed, reliability and a small footprint. Its Resolution Enhancement technology produces sharp, black, clean text and bears comparison with true 1,200dpi output but its graphics capabilities are less impressive. Unique among the printers in this round-up is the 1100's optional JetPath scanning attachment, which adds sheet-fed

scanning and copying capabilities using a 'pod' that clips on to the front.

Setup didn't take long. It may be pricey but at least HP includes a proper printed manual along with the obligatory online user guide. The driver setup was as slick as ever. The 1100 has an odd-ball high-density Centronics socket so you have to use the special printer lead that comes with it. Ergonomically, it's well thought out – like Canon's LBP 800, there's a rear vertical-mounted

paper tray plus a corresponding output tray at the front. The printer has minimal controls – just one illuminated button (it lights up when you have to press it) and a couple of status LEDs. It's also easy to add extra RAM: all you have to do is lift up a hinged flap at the rear to access the non-standard 100pin SIMM socket.

The Windows driver is of a high standard and users have a variety of options and settings in the interface,

including printing multiple sheets on one page, manual duplexing and watermarking. Status feedback is conspicuous by its absence, though.

Paper handling is modest and the paper tray holds only 125 sheets, which is hardly enough for a typical office. With a duty cycle of 7,000 pages a month, the 1100 should, however, meet the demands of most small offices. Its £60 toner cartridge is good for about 2,500 pages and, with an average cost of 2.4p per page, it's the most expensive of all the laser printers we tested.

On our performance tests, the 1100 was a mixed bag, delivering the goods on text printing but doing fairly poorly when it came to graphics tasks – in fact, it was the runt of the litter in this respect.

DETAILS

★★

PRICE £386.58 (£329 ex VAT)

CONTACT HP 0990 47 47 47

www.hp.com/uk

PROS Simple to use and run; scanner option is a novelty

CONS Expensive to run; slow on graphics

OVERALL The LaserJet 1100 is distinctly average among its peers – it's slow, expensive to buy and expensive to run. Check out Canon's LBP 800 instead



IBM Infoprint 12



THE LAUNCH of the Infoprint range marks a return to form for Big Blue, which has been out of the printer market for quite some time. The Infoprint 12 is very different to all the other printers in this test – it's jet black rather than the ubiquitous beige so beloved of the PC world. Its RRP is only a fiver more than HP's LaserJet 1100 but the two printers are miles apart.

The Infoprint 12 is a 12ppm unit

that supports both 600 and 1,200dpi printing, in PCL5e and PCL 6.

PostScript Level 3 is an optional extra. The Infoprint is well served on the I/O front, with both parallel and USB ports as standard.

In many ways the Infoprint 12 is a little version of a 'proper' laser printer, with stackable paper trays and big printer specification. It is, as a result, a bit bigger and heavier, too.

The Infoprint comes with excellent driver support – as well as the usual Windows drivers, you'll find OS/2 and Linux. The Windows driver is well featured, with a tabbed dialog offering comprehensive controls over resolution and good graphics quality controls. You also get a wide range of layout options such as booklet printing, face up/down printing, and watermarks.

Driver installation could have been

better – it's not easy to track down the online Reference Guide. Also the very useful Remote Control Panel is listed as 'RCP' in the Setup menu – so initially we didn't install it because we didn't know what it was.

At first we were disappointed with the output quality, which looked very faint, a situation we couldn't alter from within the driver. However, once we'd installed the 'RCP', we discovered why it was so – toner-saving Econo Mode had been turned on. Turning it off improved matters considerably.

Graphics printing was particularly smooth and free from artefacts and banding. In contrast, its 1,200dpi text output was distinctly disappointing and easily eclipsed by the Epson EPL-5800.

DETAILS



PRICE £392.45 (£334 ex VAT)

CONTACT IBM Printing Systems

020 7202 3000

www-5.ibm.com/uk/printers/

PROS Very well specified printer; good driver support; good expansion potential

CONS Expensive; disappointing 1,200dpi performance

OVERALL Comes close, but doesn't quite win

Kyocera FS-1000



ALL KYOCERA PRINTERS enjoy broad specifications and the FS-1000 is no different – it's a 10ppm, 600dpi printer, with a choice of no fewer than four print emulations including PCL6. PostScript Level 2 is an optional extra. Additional paper trays can be fitted beneath the main 250-sheet tray and you can fit an optional internal Ethernet card, so this is a little printer with big pretensions, but sadly has no USB port.

Setting up the printer took longer

than expected. Installing the software was the first hurdle. There's no simple front-end installation

program to guide you through all the software on the CD-ROM – and there's quite a lot of it, so it's difficult to know what's relevant and what's not. In fact, while there were drivers for every

other Kyocera printer, there were no specific drivers for the FS-1000 on the CD-ROM so we got

the 390KB download from the Kyocera website. Also, when the printer is first powered up, it takes 15 minutes to initialise, a process not found in any of the other printers we looked at.

Although the FS-1000 has a range of diagnostic status LEDs, it can also be managed using Kyocera's Remote Operation Panel (ROP). This useful software utility communicates with the printer and allows you to check on and configure it from the desktop.

Another feature of the ROP is a 3D display of the device, to aid troubleshooting, locating paper jams and any open panels.

Kyocera's range of printers is among the most ecologically friendly around, with most of the parts you'd expect to throw away being fully recyclable.

The FS-1000 was a bit of a disappointment when it came to performance, returning 8.38ppm on the text test and dropping dramatically when it came to graphics, managing 2.36ppm on the Acrobat test and 2.64ppm on the PowerPoint test. Print quality wasn't bad, though graphics looked a little grainy. However, there is some compensation in that its running costs only amount to 0.9p per page.

DETAILS



PRICE £351.33 (£299 ex VAT)

CONTACT Kyocera 0118 923 0789

www.kyocera.co.uk

PROS Low running costs; good specification; good expansion capabilities

CONS Poor/slow graphics performance; high initial cost

OVERALL The FS-1000 is fine as a cheap to run, heavy-duty text workhorse but is otherwise a fairly average printer

Lexmark Optra E-312L



THE OPTRA E-312L

is the budget version of the 312, with fewer options and a commensurately lower price. It's a 10ppm, 600dpi printer that retails for £211 – it also offers a '1200 Image Quality' resolution as well. The E-312L comes with only 2MB of RAM, but at least it takes dirt-cheap standard SIMMs. It is also blessed with both parallel and USB ports. Like many of the printers in this group test, it has a familiar form factor, with 150-sheet

vertical paper input and 100-sheet output trays, which is fine for light use but is inadequate for a busy office.

Getting the Optra E-312L up and running caused no problems.

It's supplied with two CD-ROMs, one containing the online user manual and the other containing all Lexmark printer

drivers and MarkVision, Lexmark's printer management software.

The printer is software

controlled – the unit only has a couple of status LEDs and a multifunction button. The driver offers options for multi-page printing on a single sheet, overlays, print density and contrast adjustments, so no complaints here.

The E-312L enjoys wide driver support, ensuring compatibility with pretty much every system going. It's easy to install with both USB and parallel interfaces, the drivers are compatible with everything from Windows 3.1 to

2000, including NT 3.51 and NT4. You also get drivers for DOS, OS/2 2.1 plus various flavours of Linux, Unix and Sun Solaris. You also get compatibility with both PCL5 and PCL6 emulations.

Image quality itself is above average, which considering the price is a bonus. However, the meagre amount of memory the E-312L comes with exacts a toll when it comes to performance – it was painfully slow when printing the 50-page pdf file, managing a mere 2.55ppm. On text, it could manage a more respectable 8.65ppm, which is still short of its claimed 10ppm. Running costs are on a par with other printers in this test, at around 1.6p per page.

DETAILS



PRICE £249 (£211.91 ex VAT)

CONTACT Lexmark 01628 481 500, www.lexmark.co.uk

PROS Excellent driver support; easy to use; good print quality

CONS Lacks RAM, which explains slow graphics output

OVERALL The Optra E-312L is another example of a 'big' little printer and enjoys many of the features found on the more expensive Optras, but without the price tag. Print quality is good, but it's slow when printing graphics

Minolta-QMS PagePro 1100L



ONCE AGAIN A

LOW price doesn't necessarily mean a low spec – the PagePro 1100L is a 600dpi printer that can deliver pages at 10ppm. The 1100L is in fact a reduced feature version of the 1100, which sells for slightly more. That model offers PCL6 emulation – the 1100L uses QuickPage instead.

The 1100L is cleverly designed to minimise costs – the curved translucent

cover doubles as the output tray, while the 150-sheet input tray is the pull-down front panel. The 1100L is a GDI (graphics device interface) printer so is limited to the Windows OS (not NT3.51 or Windows 3.1). It has a 4MB buffer that can't be expanded.

There are no frills on the PagePro 1100L, it's a very basic laser printer – it has just two status LEDs and everything is controlled onscreen.

Driver installation was a mixed bag. The setup program had an unnecessarily flash front end and yet the installer asks basic questions that it really should have been able to work out for itself.

The 1100L is a true GDI printer which essentially means that it is dependent on the host PC to provide much of the crunching power while it rasterises an image and so on.

The drivers had a distinct Windows 3.1 feel to them – even on a 1GHz Pentium III machine, whenever it was given a long print job, the driver would soak up 100 per cent of CPU cycles and every now and again the PC would momentarily freeze up during a print job.

Nevertheless, when it came to performance, the PagePro 1100L didn't disappoint and more or less delivered what it promised, print speeds of just over 9ppm for Word and Acrobat and almost 7ppm for PowerPoint – speeds that put many dearer printers to shame. Running costs are good but not exceptional at about 1.4p per page, which is about par for the course.

DETAILS



PRICE £170.37 (£145 ex VAT)

CONTACT Minolta-QMS 01784 442 255 www.minolta-qms.co.uk

PROS Fast; cheap; decent print quality

CONS Those GDI processor hiccups

OVERALL It's hard to go wrong with a laser printer at this price – it's fast, compact, works well and doesn't cost the earth to run. If you don't mind the occasional hiccup on your processor, the PagePro 1100L is well worth considering



Oki OKIpage 14ex



ALTHOUGH IT'S referred to as a laser printer, none of the printers Oki produces employ lasers – they use an array of finely pitched LEDs to place an electrostatic charge on the photo-sensitive drum.

The OKIpage 14ex follows the traditional Oki house style of a low-slung form factor with a 'proper' control panel at the top rear edge of the printer – this comprises an eight-key keypad

with a status panel. This may appear 'old fashioned' but the OKIpage 14ex is bang up to date: it has a USB port as well as parallel.

It should have been easy to install the drivers but we found it a trifle long-winded, particularly if you wanted to use the parallel port.

Once installed, though, the driver is fully-featured and supports such desirable features as multi-page printing, binding margins, graphics quality controls and watermarks. Installing the toner cartridge can be a relatively dirty affair compared to the 'clean hands' toner cartridges originally pioneered by HP and Canon. With the OKIpage you insert a tube of toner in to the top of the print mechanism and rotate a tab at one end of it. Though messy, this is simpler than it sounds.

At a claimed 14ppm, the OKIpage

14ex was the fastest rated printer in this group test and while it never actually hit that speed it did manage over 12ppm on both the Word and Acrobat printing tests, though it didn't do so well on the PowerPoint test. However, the graphics quality was rather uninspiring and cheaper lasers were easily better than the OKIpage14ex in this regard. Nevertheless, over 12ppm for a £272 printer is still pretty good going. It was also the quickest at delivering the first page at 12 seconds, though this was slower than the 7.5 seconds claimed. The upside of all this is that running costs are commendably low, at about 1.1p per page.

DETAILS



PRICE £319.60 (£272 ex VAT)

CONTACT Oki 01753 819 819

<http://europe.oki.com/>

PROS A fast, good quality text printer that's cheap to run

CONS Graphics quality is relatively poor

OVERALL The OKIpage 14ex is undoubtedly fast and its print quality is fine for text work, but less so for graphics. It's also the second cheapest printer to run so it's a good choice for a busy office that churns out plenty of correspondence

Samsung ML4500



SAMSUNG'S LATEST entry-level offering sells for less than £150, which makes it the cheapest laser printer on the market, and cheaper than plenty of inkjets. It has a respectable specification, too: 8ppm with 600dpi resolution. However, you wouldn't expect to find frills on a printer at this price point so you won't be too surprised to learn that luxuries like a USB port aren't present on the

ML-4500, although a parallel cable is included.

The ML-4500 has a fairly small footprint and won't occupy too much desk space. Its form factor is similar to other lasers in this class – it has a vertical paper bin at the rear with an integral tray to the front, thus presenting a U-shaped paper path, though if you want to print on thicker paper

stock, a flick switch lets paper emerge horizontally at the front. As with most printers, the front panel pulls forward to give you access to the one-piece toner cartridge. The 4500 is simple to operate – there are no controls *per se* on the unit itself bar the toner saving button, and it has a trio of status LEDs for data, out of paper and error.

Once again, this printer was easy to commission. There's no printed manual – full documentation is provided online

in pdf format – the supplied 'get you started' poster should be enough for most users. The Windows driver was simple to install. This is fairly basic compared to its peers – you can choose between 600 or 300dpi resolutions, opt for toner saving or to use either vector or raster graphics, but that's about it.

Despite being built to a price, this £150 printer outperformed others costing twice as much in our tests, returning a print speed of 6.98ppm when printing the 50-page Acrobat file, which was a pleasant surprise. At 1.7p per page, its running costs were slightly higher than average, though.

DETAILS



PRICE £149.99 (£127.66 ex VAT)

CONTACT Samsung Electronics
020 8391 0168

www.samsungelectronics.co.uk

PROS Unbeatable price; reasonable performance

CONS Basic facilities; slightly higher running costs

OVERALL A cheap and cheerful entry to the world of laser printing, the ML4500 puts many more expensive printers to shame. It's basic but at the end of the day, it prints text very well, given its price tag

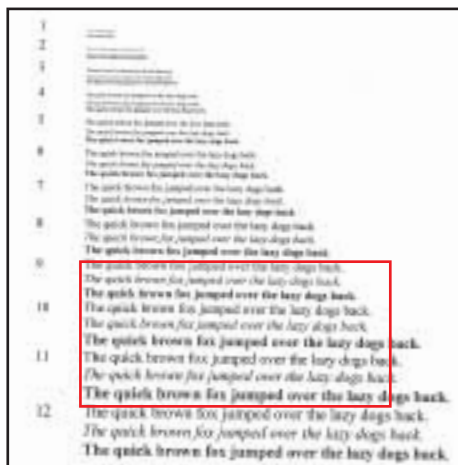
How we did the tests

We connected each printer to the EPP parallel port of a 1GHz AMD Athlon II Windows 98SE system with 128MB of RAM. Some printers did come with USB ports but in order to make all the tests strictly comparable, we used only the parallel port for our testing. All performance tests were done with each printer set to its 600dpi setting. A few printers did offer higher print resolutions than this but these were typically interpolated resolutions and not true resolutions. Most of the time these printers will be used for printing documents, reports and spreadsheets and the difference between 600dpi and 1,200dpi on 12pt text is hard to detect without the aid of a magnifying glass.

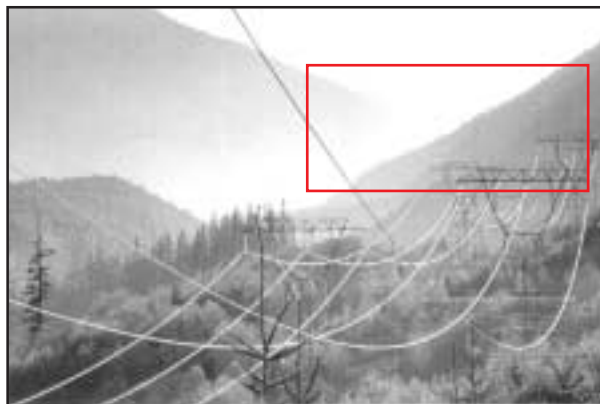
The PCW suite of printer tests comprises six documents. Four are used in printer speed tests, the other two are used to establish overall print quality. They are as follows.

Graduated text test

This is a short formatted Word document consisting of a one-line sentence printed three times in normal, italic and bold, repeated in various point sizes from 1pt to 12pt. The font used is Times Roman and the page is printed once, using Word 2000. So, this is a test of the ability to print text legibly



The sample text used in the graduated text test



The complete image used in the greyscale image test

at small point sizes plus a test of overall text quality (see p184). Interestingly, most laser printers are, thanks to their 600dpi resolutions, able to print legible text down to 2pt, though you need a linen tester or magnifying glass to actually read it.

Greyscale image test

This is a black and white photo of a misty mountain panorama – the image has 256 levels of grey. It was printed out in landscape mode, at 100 per cent size, using Paint Shop Pro 5. Subtle graduated fills are difficult for any printer to realistically produce, such as the light greys of this test image. Many typically produced banding across these fills, making the image look uneven. This is a hard test, given that most laser printers are destined to produce only

text documents. Still, thanks to their typical, high resolution of 600dpi, most were able to make a decent fist of the image (see p185).

Printing pdf files

This is a 50-page Acrobat pdf file, consisting largely of text with some simple graphics thrown in. It was printed using Adobe Acrobat Reader v4.05 using its default settings. While a pdf file may resemble pages of text, as far as the printer is concerned, this is one huge graphics file with 50 pages and so is particularly demanding. Factors such as installed memory and processor power would affect print speed here – greater RAM allows more of the image to be buffered, meaning that the printer does not have to be drip-fed data by the PC, while a faster processor in the printer accelerates the rasterisation process, a particularly computer-intensive task. This was reflected in the wide range of print times achieved (see opposite) – some printers found printing out pdfs particularly hard going.

Printing an rtf file

This is another Word file, this time in Rich Text Format rather than the native Word format. It's a simple, mainly unformatted, document that's 50 pages in length. Word 2000 is used to print it out. This is the test where most printers turn in

their best performance – after all, printing text isn't particularly demanding. Again, as these printers will be confined to mundane letter printing for most of their lives, in some ways, this is arguably the most important test of all (see opposite).

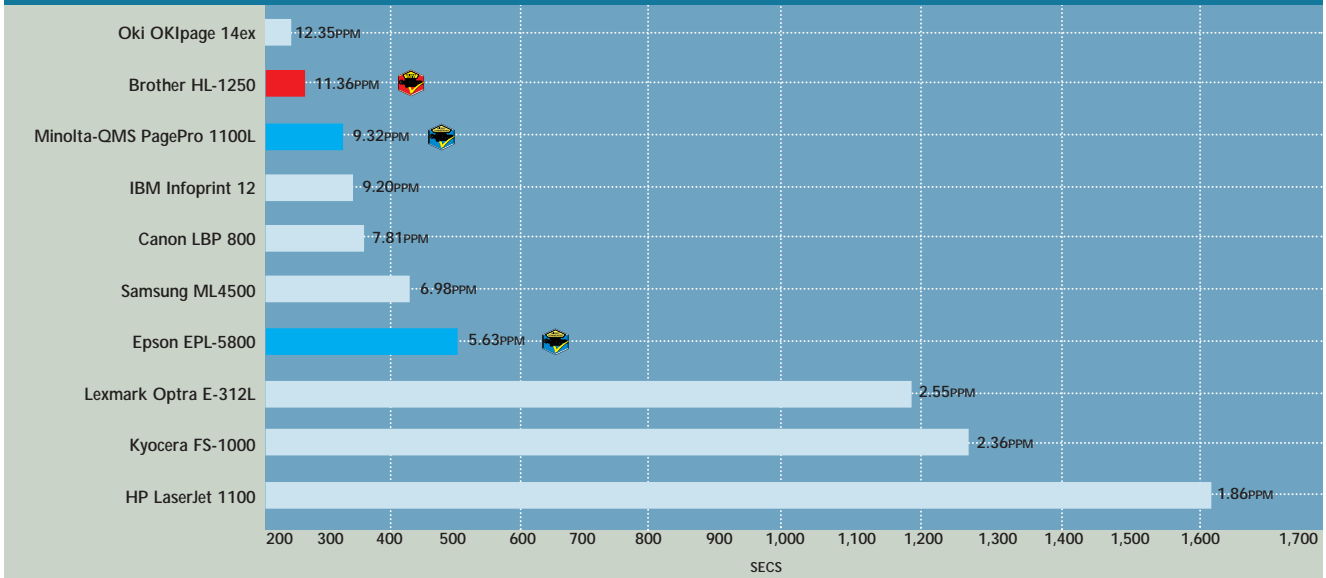
The PowerPoint test

This is a 12-slide PowerPoint presentation comprising a plain background, basic clipart and a few bullet-pointed text lines per page. It is a speed test. This was printed, using PowerPoint 2000, with the print dialog set for handouts, three to a page. This is a speed test, with the stopwatch started when the Print dialog OK button was clicked and stopped when the final page completely emerged from the printer into the output tray. Again, like the Acrobat test, this is quite demanding and some printers fared better than others when put to this particular test (see opposite).

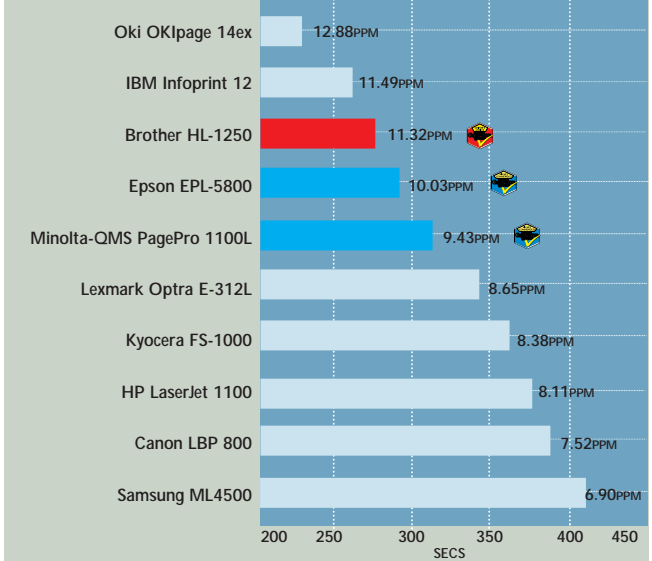
Coverage test

This uses a standard Word document calculated to have five per cent of the page covered with text. The test times how long the printer takes to produce a single-page – this is typically longer than it takes to print the second and third pages. We waited until the printer entered power-saving standby mode and then print the same single-page document again. The difference between the two times (see opposite) tells us how long the printer takes to warm up (elements such as the fusion roller need to be sufficiently hot to melt the toner onto the page to make it permanent). Some printers, such as the Canon LBP 800 and HP LaserJet 1100, had such short warm-up times that they entered standby mode almost immediately, thus saving power almost continuously.

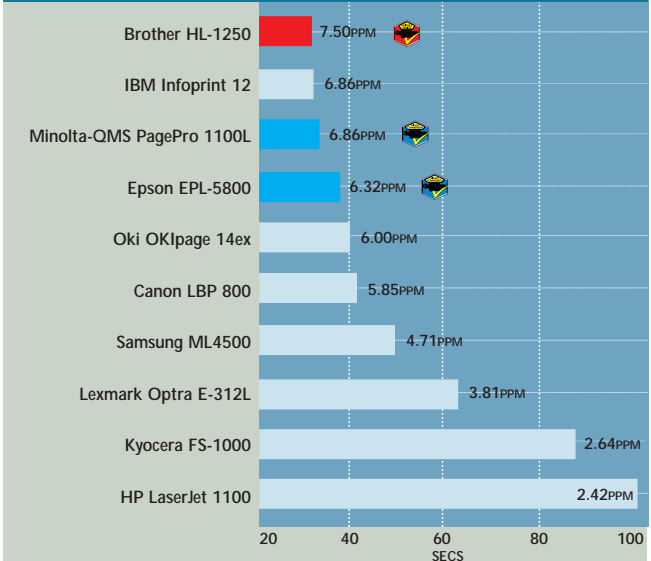
Printing a pdf document



Printing a Word rtf document

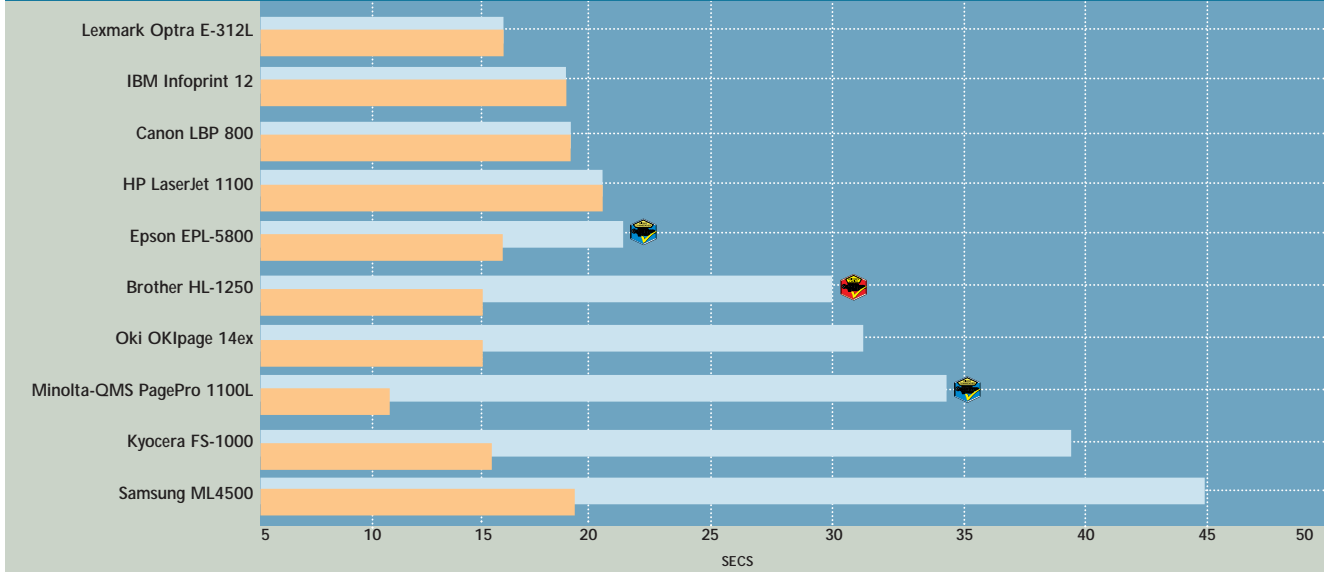


Printing a PowerPoint document



Printer performance was measured in the number of seconds taken to complete a job. In all of the graphs, shorter bars indicate better performance. The figures at the the end of the bars in the three graphs above indicate the relative speed in pages per minute (ppm), calculated by dividing the number of pages printed into the time taken to complete.

Five per cent coverage – sleep ■ Five per cent coverage – awoken ■





Greyscale image test results

Brother HL-1250



Canon LBP 800



Epson EPL-5800



HP LaserJet 1100



IBM Infoprint 12



Kyocera FS-1000



Lexmark Optra E-312L



Minolta-QMS PagePro 1100L



Oki OKIpage 14ex



Samsung ML4500

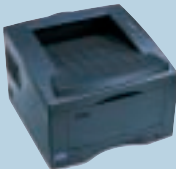







Table of features



MANUFACTURER	BROTHER	CANON	EPSON	HP
MODEL	HL-1250	LBP 800	EPL-5800	LASERJET 1100
Price inc VAT (ex VAT)	£316.08 (£269)	£209 (£177.87)	£374.83 (£319)	£386.58 (£329)
Phone	0845 606 0626	0500 246 246	01442 611 144	0990 474 747
URL	www.brother.co.uk	www.canon.co.uk	www.epson.co.uk	www.hp.com/uk
Price per page (five per cent coverage)	1.2p	1.6p	1.5p	2.4p
Supplied memory	4MB	512KB	16MB	2MB
Maximum memory	36MB	512KB	256MB	18MB
Ports	Parallel/USB	Parallel	Parallel/USB	Parallel
Processor	66MHz MB86832	See note below	133MHz RISC	35MHz M5202
Resolution (dpi)	600 x 1,200	600	1,200	600
CONSUMABLES				
Toner cartridge (price ex VAT)	£47	£40	£73.34	£60.31
Image drum (price ex VAT)	£87	N/A	£51.85	N/A
Combined unit (price ex VAT)	N/A	N/A	N/A	N/A
OPERATION				
Pages per minute	12	8	10	8
Time to first page (in seconds)	15	18	16	18
Maximum pages per month	15,000	See note below	15,000	7,000
Toner life (pages)	6,000	2,500	6,000	2,500
Drum life (pages)	20,000	See note below	20,000	N/A
Engine life (pages)	200,000	See note below	N/A	N/A
LANGUAGES				
PCL level	6	See note below	6/5e	5e
PostScript level	N/A	See note below	Optional	N/A
Other	Epson FX/ProPrinter	Canon Advanced Printing Technology	Esc P2/FX	N/A
PAPER				
Paper tray capacity (pages)	250	125	150	125
Output tray capacity (pages)	150	100	100	100
Separate manual feeder?	✓	✓	✓	✓
SOFTWARE SUPPORT				
Windows 95/98	✓	✓	✓	✓
Windows Me	✓	✓	✓	✓
Windows NT	✓	✓	✓	✓
Windows 2000	✓	✓	✓	✓
Windows 3.1	✓	✓	✓	✓
Other	Mac	N/A	Mac	OS/2/DOS/Unix
Number of additional fonts	61	See note below	31	26
DRIVER OPTIONS				
Media selection	✓	✓	✓	✓
Realtime status display	✗	✓	✗	✗
Smoothing/resolution enhancement	✓	✓	✓	✓
Multiple pages per sheet	✓	✓	✓	✓

Note: Canon declined to supply this information

					
IBM	KYOCERA	LEXMARK	MINOLTA-QMS	OKI	SAMSUNG
INFOPRINT 12	FS-1000	OPTRA E-312L	PAGEPRO 1100L	OKIPAGE 14EX	ML4500
£392.45 (£334)	£351.33 (£299)	£249 (£211.91)	£170.37 (£145)	£319.60 (£272)	£149.99 (£127.66)
020 7202 3000	0118 923 0789	01628 481500	01784 442 255	01753 819 819	020 8391 0168
www-5.ibm.com/uk/printers/	www.kyocera.co.uk	www.lexmark.co.uk	www.minolta-qms.co.uk	http://europe.oki.com/	www.samsungelectronics.co.uk
2p	0.9p	1.6p	1.4p	1.1p	1.7p
4MB	4MB	2MB	4MB	4MB	4MB
68MB	132MB	66MB	4MB	36MB	68MB
Parallel/USB/Ethernet option	Parallel	Parallel/USB	Parallel	Parallel/USB	Parallel/USB
66MHz RISC	75MHz PowerPC	67MHz Toshiba	Mitsubishi M3807	50MHz RISC	35MHz RISC
1,200	600	1,200	600 x 1,200	600 x 1,200	600
£120	£54	£97.03	£68	£24	£42.55
N/A	N/A	N/A	£45	£105	N/A
N/A	N/A	N/A	N/A	N/A	N/A
12	10	10	10	14	8
14	15	15	15	7.5	15
20,000	8,000	10,000	15,000	15,000	2,000
6,000	6,000	6,000	6,000	4,000	2,500
N/A	100,000	120,000	20,000	20,000	N/A
N/A	100,000	120,000	N/A	180,000	50,000
6/5e	6	6	N/A	6	6
Optional	Optional	2	N/A	N/A	N/A
N/A	Epson LQ/Diablo630/ Proprinter	PPDS	QuickPage	IBM Pro Printer III XL/ Epson FX SIDM	N/A
250	250	150	150	250	150
250	150	100	100	200	100
✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓
x	✓	x	✓	✓	✓
OS/2/Mac/Linux	DOS	OS/2 2.1/DOS/Linux/ Unix/Mac/Sun Solaris	N/A	Mac	Mac/Linux
45	45	77	N/A	45	45
✓	✓	✓	✓	✓	✓
x	x	✓	✓	x	x
✓	✓	✓	x	x	✓
✓	✓	✓	✓	✓	x



Editor's Choice

Although we subjected these printers to quite stringent graphics testing, let's be realistic here – few users would want to output graphics to a laser printer on a regular basis, not when photo-realistic inkjet printers are available that can make a much better job of it. True, some of them did acquit themselves – the Lexmark Optra E-312L and the IBM Infoprint 12 delivered the most pleasing greyscale images. Nevertheless, given the choice, most users would probably prefer to see colour rather than greyscale images. So for this reason, at this end of the laser printer market, the ability to print accurate greyscale images, while important, isn't critical.

No, while many users will use them to print charts and presentation handouts, by far the biggest use of these printers will be for text printing: letters, reports and spreadsheets. Here, it becomes difficult to differentiate between the print qualities of these printers, certainly with the naked eye. These were all 600dpi, or better, models and this sort of resolution produces very clean-cut text at all standard point sizes. On this basis all of the printers we looked at were more than suitable for text printing.

Differences in text print quality did exist between them but you had to use a linen tester or magnifying glass to be able to detect them. There were one or two surprises here. First, 1,200dpi printing doesn't noticeably improve text quality and imposes a significant performance hit. For example, the IBM Infoprint 12's 1,200dpi text was almost indecipherable at tiny point sizes. This was in stark contrast to the Epson EPL 5800, which

could deliver crystal-clear text at 1pt while printing at 'only' 600dpi, which is a remarkable feat. If you're looking for the ultimate in text quality in an entry-level printer then you should give the Epson serious consideration.

We now turn to the other major differentiator – print speed. There may not have been much between the printers when it came to printing text but they sure took differing amounts of time to do the job.

When the first personal lasers appeared several years ago, they were 4ppm and 6ppm printers – today we have nothing slower than 8ppm and some as high as 14ppm. These are manufacturers' claimed speeds and as far as text printing is concerned these claims are more or less in the right ball-park. The OKIpage 14ex was the fastest, at 12.88ppm, closely followed by the IBM Infoprint 12 and the Brother HL-1250 at 11.49ppm and 11.32ppm respectively.

The picture was less rosy when it came to printing graphics and here, limitations in memory and processing power threw into stark relief the real differences between the printers. The HP LaserJet 1100 fared the worst when it came to graphics while others that 'could do better' included the Kyocera FS-1000, Lexmark Optra E312L and the Epson EPL 5800 which were all pretty slow at outputting graphics.

Running costs are an important issue and those pennies soon mount up if you do a lot of printing. Kyocera prides itself on offering the lowest running costs of any manufacturer and so it is with the FS-1000 – 0.9p per page was the lowest per page cost. The OKIpage 14ex was

close behind at 1.1p, followed by the Brother HL-1250 at 1.2p. Bringing up the rear was the HP LaserJet 1100 at 2.4p.

All the printers offered good value for money, even the dearer ones, which typically offered a better specification and greater expansion potential. But of course some offered more value for money than others, in particular the Samsung ML4500, the Minolta-QMS PagePro 1100L and the Canon LBP 800.

The winners

Now comes the hard part – deciding on the Editor's Choice. It was a close-run thing, essentially a photo-finish but there can only be one winner. Taking all these factors into account, the **Editor's Choice** in this laser printers group test goes to the **Brother HL-1250**. While by no means a perfect printer, it offered the best overall combination of print quality, print speed and price. Its running costs were low and it enjoys wide driver support.

On to the **Highly Commended** printers. One of these has to be one of the bargain-basement printers simply because they offer tremendous value and still deliver the goods. While the Samsung ML4500 was the absolute cheapest, the £20 premium you pay for the **Minolta-QMS PagePro 1100L** is probably worth it as it's faster and cheaper to run.

The final **Highly Commended** award goes to the **Epson EPL-5800** for the simple reason that it delivered the best quality text printing we've seen in this price bracket. Since high-quality text printing is very important in a business environment, the Epson is an attractive SoHo option.



Brother HL-1250: the best combination of speed, quality and price



Minolta-QMS PagePro 1100L: fast and cheap to run



Epson EPL-5800: delivered the best quality text printing in the group test



Digital video camcorders

Digital video cameras offer a massive leap in picture quality over their analog counterparts and pave the way for professional desktop video editing. We put seven of the latest models to the test

Just as digital editing of still pictures has opened up new creative possibilities for photography, so digital video (DV) is changing the way we create moving pictures. It's only recently that PC hardware has been up to the task of manipulating the vast quantities of data that make up digital video images.

For years video enthusiasts have been capturing and digitising analog video, editing the digital footage and then recording an analog signal back to VHS tape. Now, however, DV camcorders have completed the picture, providing an all digital environment – from capture to viewing and this of course leads to almost limitless editing possibilities.

The first advantage of DV is quality. DV provides much better picture quality than any of the analog formats that preceded it including S-VHS and Hi-8. And it's quality that doesn't degrade with copying.

With the exception of the Sharp VL-SD20H and Samsung VP-D55 all of the camcorders reviewed here have a bi-directional FireWire port, which means that as well as capturing digital video to your hard disk for editing you can digitally record back to a DV tape in the camcorder

All of the models provide in-camera special effects, though it's usually much simpler to do this kind of work on the

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• Digital video camcorders tested and reviewed by Ken McMahon



PC. More usefully they all include a digital image stabiliser which dampens the inevitable shakes and wobbles that occur when you're shooting handheld footage.

You'll see two figures quoted for zoom magnifications, the first tells you the maximum optical zoom, the second is the digital zoom factor. Don't be taken in by high digital zoom figures of 200 or even 400x. These are virtually useless. The digital zoom simply takes the centre portion of the image and enlarges the pixels so the resolution and picture quality drops dramatically once you more than double the optical zoom factor. So if a camcorder has a maximum optical zoom of 10x, the digital zoom won't be much use beyond 20x.



Canon MV300i



ONE OF THE MOST appealing things about the Canon MV300i is its size – it's Canon's smallest camcorder to date. Although, at £730, it's not the cheapest DV camcorder on the market, it is one of the more compact and stylishly designed. It fits snugly into the palm of your right hand and its dimensions mean you could probably carry the camera around in your coat pocket.

A two-position thumb switch turns on the power and sets the mode – up for camera, down for VCR, and a central button activates record and pause. You can either use the viewfinder in its docked position or rotate it vertically where the rear section extends out and a concealed slider provides optical adjustment for spectacle wearers – tucked away where it won't get accidentally moved. Moving towards the top-right corner of the camera, you can find the 'photo' button – easily activated with your index finger – and just in front of this is the zoom rocker that will magnify the image by up to 10 times using the lens and 200 times digitally, by filling the frame with the central portion of the image at reduced resolution.

On the right side a push-button latch releases the LCD panel. With the panel folded out three buttons are revealed, two of these control a selection of four digital effects that can be applied during playback, and the third activates the on-screen menu (OSM). In comparison with some of the other models on test the Canon's effects repertoire is scant, but if you're planning to edit your

movies on a PC this won't be of too much concern.

There's also a two-position program selector that gives you the option of 'easy recording' or one of the programmed auto-exposure modes. Easy recording takes care of focus and exposure and activates the image stabiliser.

It also locks most of the OSM functions, so you can't accidentally switch to one of the AE modes, or select manual exposure. In addition to auto there are five specialised AE modes, each of which optimises the settings for particular conditions – sports, portrait, spotlight, sand and snow, and low light. For the most part these work pretty well and only the very keen will want to go completely manual. Manual operation requires a certain dexterity as shutter speed, exposure and focus must all be set using the tiny control wheel in the bottom-right corner which is used to scroll and select in the OSM.

The MV300i is a bottom-loader – an increasingly popular system that's also used by Panasonic, Samsung and Sony. While it may make for a more compact design, the big problem is that if the camera is mounted on a tripod you have to remove it before you can change tapes. This will only be an issue for a small minority of users as the camera is very much a handheld device – those who are attracted by its compactness are unlikely to want to stick a couple of pounds of aluminium tubing to it.

Picture quality is very good and playback on the LCD panel is bright and

crisp when viewed indoors. The panel was bright enough – once adjusted using the OSM – for shooting outdoors, although in bright sunshine, as with any camcorder, you'll need to resort to the viewfinder. As well as turning 180 degrees to face front, you can push and lock the panel back into the camera body, which is quite neat. The sound level from the built-in speaker is adequate and the volume can be adjusted using the OSM wheel. The only complaint with the VCR controls was that, having reviewed what you've just filmed, it's almost impossible to accurately reposition the tape so that you can carry on shooting (although this can be done with the remote).

In low light the autofocus was often unable to get a fix, wandering in and out of focus, unable to find a resting place. It exhibited the same behaviour using the digital zoom, although as with all digital zooms, above 40-times magnification the image quality is so poor there are no contrasting edges to focus anyway. By contrast, the MV300i has one of the best image stabilisers around (bettered only by the Sony TRV20E), making it possible to shoot handheld at the maximum optical 10x zoom and keep the subject, if not rock-steady, at least reasonably centred within the frame. If you've tried this at home, you'll know that it's virtually impossible without some clever electronics to iron out innate judders.

We had no problems capturing and recording DV footage and the device control worked faultlessly right from the off. Incoming DV can be fed back out to a TV or monitor via the A/V port, but there's no analog input, which will be a big disappointment to anyone hoping to transfer their analog archives to DV.

The MV300i is a DV-in version of Canon's nEUtered (see box p201) MV300 which costs around £100 less. The big question is why? The additional tax doesn't come near that figure and the cost involved in not disabling a machine can't be significant.

If Canon wants to succeed in the DV market it needs to rapidly rethink its approach to pricing for DV-in models.

DETAILS

PRICE £730 (€621.28 ex VAT)

CONTACT Canon 0800 616 417

www.canon.co.uk

PROS Compact; good picture quality; easy to use

CONS Poor low-light performance; no analog input

OVERALL The ideal take-anywhere DV camcorder

FEATURES

PERFORMANCE

EASE OF USE

OVERALL RATING

★★★★

★★★★

★★★★

★★★★

JVC GR-DVX10



THE SMALLEST OF THE camcorders in this group test, JVC's GR-DVX10, is a compact palmcorder that, despite its diminutive appearance, is packed with features. Many of them come courtesy of the DVX-10's 8MB multimedia card that allows you to take digital still pictures while simultaneously shooting video, recording and audio dubbing MP3 sound effects and creating compressed, short video clips for emailing.

One of the ways JVC has managed to miniaturise the camcorder is to put most of the connectors on a docking station. This attaches to the bottom of the camera using the tripod bush and provides composite video and stereo audio RCA connectors, S-Video out, a digital still picture serial connector, printer port, mic socket and JVC's proprietary JLIP edit control socket. The IEEE 1394 DV in/out port and a separate composite video output remain on the camera.

Because of its multi-functional nature, the camera controls are quite complicated, although you can, of course, ignore most of them and point-and-shoot in fully automatic mode where exposure focus, image stabilisation and everything bar what goes on in front of the lens is taken care of. The power switch, auto/manual slider and a mode dial adorn the right side of the camera body where, with some contorting, you can reach them with the index finger of your right hand.

The power switch slides upwards

into the camera position and two downward positions provide video and memory card playback functions. The most useful position for the mode slider is 'dual' – where you can shoot video to tape and capture stills to the multimedia card. In video mode all images, still and moving, are recorded on tape. In the DSC position the camera functions solely as a digital still camera and PS mode produces non-interlaced 50fps (frames per second) video.

The record/pause button and the power zoom sit side-by-side on the back panel and the still picture button is situated just below them, which is a sensible arrangement and one that, in practice, works well. To the right of these a push-wheel controls OSM selection and doubles as an exposure and focus control in manual mode. The 2.5in TFT LCD panel folds out on the left and the slim battery sits just below it. On top is a disc with VCR playback controls which double up as a backlight compensator, manual focus and exposure selectors. Just above the lens there is a tiny built-in flash for still picture photography in low-light conditions.

The compact format takes a little getting used to. Compared with a 'conventional' camcorder layout, everything seems much more difficult to get at. If you rest your hand flat against the side and curl your fingers over the top when carrying the camera, it's difficult to reach the record button. Shifting position so that the corner of

the camera sits in the palm of your hand is the best compromise, but the absence of rounded contours means this provides neither a very comfortable, nor firm grip.

To activate the viewfinder you must pull it backwards until it locks into position. With the power switch left in the camera position, opening and closing either the viewfinder or LCD panel switches power on and off which is quite handy.

The 8MB multimedia card contains 12 sound effects in MP3 format, though it's difficult to imagine under what circumstances you might want to add an explosion, fanfare, applause, screams or jeers to your video. More usefully, the card can store up to 21 images at 1,024 x 768 resolution in 'fine' – the lowest of the two available compression modes. At this resolution the images are sampled from 962 x 654 which is the maximum the 680,000pixel CCD can produce. The multimedia card contains a small selection of picture frames that you can add to images but, as with the sound effects, you have to question the value of something like this when you can do it so much better and more easily on your PC – virtually for nothing.

Even more useful, you can transfer up to 20 seconds of compressed video from the tape to the multimedia card, download it to your PC, then send it as an email attachment. Simply locate the clip using the playback controls, press the email clip button, then hit record to start and stop the capture. Video clips can be viewed from an index in the same way as still images and sound clips.

The DVX10's biggest asset is its size. With this camera you can travel light and get the shots – moving and still – where you just wouldn't bother taking a bigger device. A lot of the features could easily be dismissed as gimmickry – the MP3 sound and picture framing and, to a lesser degree, the excellent range of video effects and transitions are all cut-price versions of the real thing now available on PC software. Nonetheless, there's undoubtedly a demand from people who haven't the time or the inclination for desktop video editing.

DETAILS

PRICE £1,300 (£1,106.38 ex VAT)

CONTACT JVC 020 8208 7654

www.jvc-europe.com

PROS Compact; lots of in-camera editing features

CONS Uncomfortable DV compatibility

OVERALL Large on features, but not in size. You won't want to leave home without it

FEATURES ★★★★★
PERFORMANCE ★★★★★
EASE OF USE ★★★★★
OVERALL RATING ★★★★★



Panasonic NV-DS150



ALTHOUGH IT MAY not look the part, in the important areas Panasonic's NV-DS150 is a real trailblazer. DV input, a host of novel features and a price tag of £650, make this the ideal choice for those who have been waiting for an affordable camcorder with the right features.

The DS150 won't win any prizes for its design, which will be recognisable to anyone who owns a Panasonic model, digital or analog, bought in the past few years. On the plus side, the DS150's dimensions make it comfortable to hold in the hand, as well as to operate on a tripod. It does, however, look quite dated.

Panasonic has opted for the bottom-loading mechanism which it also uses on the compact DS35 and DS55 models and is finding favour with other manufacturers, although not with users who prefer to do their shooting with the aid of a tripod. In all other respects the DS150's layout is conventional. The viewfinder sits atop the battery bay at the back of the camera and extends rearwards and up to provide an infinitely variable viewing angle. The viewfinder is well shielded with a rubber eyecup, but the image, which is not adjustable, is uncomfortably bright and has high contrast, and after prolonged exposure leaves an irritating after-image on your retina.

The camera is switched on using a two-position on/off thumbwheel with a centrally located record/pause button. VCR and camera mode is set by means

of a push-button with LED indicator. The zoom rocker is conveniently positioned for index finger operation as is the still picture 'shutter release'.

All setting and playback controls are located on the left-hand side of the camera, as is the LCD monitor panel which folds out to reveal a mono speaker. Playback display on the panel was soft and flat, even on the brighter of the two settings, and difficult to see outdoors.

The controls for exposure mode setting and the OSM are forward of the LCD panel, which creates two problems. You can't see the controls when making menu selections because they are behind the panel, although with a little practice this is not too difficult to get to grips with. And if you rotate the panel more than 45 degrees, as you would when shooting from a low angle, it obstructs the wheel used to operate manual focus and exposure when not in auto mode.

For everyday use the DS150 is dependable. Shooting in auto mode provided for the most part well-focused, bright pictures free from colour casts. The auto focus worked well in most situations including high zoom magnifications. However, when the foreground subject filled less than a third of the frame it had a tendency to lose it in favour of the background. The digital image stabiliser, while visibly minimising shake, failed to render a viewfinder image that could be described as stable beyond the limits of the optical zoom.

The stop, pause and play VCR

buttons double as backlight compensation, freeze-frame and fade buttons and can easily be operated with your left hand, providing you're not already using it for manual focus or exposure control. Playback functions from the camcorder are adequate though, as is usually the case, with greater control and more options available using the remote.

The DS150's built-in stereo microphone is unusual in that it zooms with the lens – the mic becomes super directional when in zoom mode. Sound quality from built-in mics is never great, and when the Panasonic's mic zooms, it records only mono. Nonetheless, in the absence of an external mic, it is a big improvement on the inaudible murmurs you hear when recording distant subjects with a built-in mic.

Another useful-sounding feature is what Panasonic calls the zero lux night-view function that is set by means of a sliding switch just rear of the lens mount. This records black and white video using refracted infra-red illumination provided by a beam emitter mounted below the lens. Used in combination with another novel feature – motion sensor control – this provides the perfect feature for wildlife videographers who value their sleep. The subject needs to be quite large in the frame for the motion sensor to work, and the effective range for the IR beam is about three metres. Once motion is detected the camera continues recording until the tape, or the power, runs out.

The DS150 provided no surprises, capturing and recording video via the FireWire port. All the camera's sockets are situated behind a plastic cover on the front-left of the camera – easily accessible when you need them, invisible when you don't.

Despite its conservative bad looks the DS150 has a lot to offer and at a price that brings DV into the mainstream. It has taken a long time for camcorder manufacturers to start listening to consumers, but Panasonic has most definitely got the message. Let's hope others follow suit.

DETAILS

PRICE £650 (£553.19 ex VAT)

CONTACT Panasonic 08705 357 357

www.panasonic.co.uk

PROS Low, low price; novel features; reliable operation

CONS Dated styling; uncomfortable viewfinder; bottom-loading

OVERALL Low on price; big on features. Makes spending more hard to justify

FEATURES	★★★★★
PERFORMANCE	★★★★
EASE OF USE	★★★★
OVERALL RATING	★★★★

Samsung VP-D55



AT £630 THE SAMSUNG VP-D55 is the cheapest DV camcorder in this group test and, unless you can find an exceptionally good deal on Panasonic's NV-DS150, probably as cheap as it currently gets.

Make no mistake, this camcorder has budget written all the way through it, from the miniscule black and white viewfinder to the f1.6 Samsung lens. Let's start with ergonomics. At first glance the VP-D55 exhibits the same brick-like contours of so many of its competitors, but the corners haven't been rounded off and less care has been taken with the positioning of controls. The result is that it never feels at home in your hand and everything, from switching it on to operating the zoom, is a struggle.

The power switch, for example, is the usual two-way thumbwheel affair, but with a tiny green lock button that must be pressed in a long way before the switch will rotate to either the player or camera positions. It's almost impossible to rotate the switch to use the camera, unless you have extraordinarily long, dextrous thumbs.

The viewfinder differs from that used in most other models in two respects: it's mono and about half the size of a standard viewfinder. The coating on the inside of the viewfinder eyepiece is slightly reflective, so rather than seeing the image floating in a black void it's rather like looking down the inside of a toilet roll tube at a postage stamp. Thankfully, the LCD panel functions

pretty well, and as most of the setup buttons are behind it, you're better off using this anyway. As with all LCD panels it's not easy to see in bright sunlight, in which case you're stuck with the viewfinder.

With the panel folded out you can access the OSM which, among other things, lets you adjust the panel brightness, activate the image stabiliser, digital zoom, Program AE and manual modes, and set the white balance mode. The choice of which functions to allocate to dedicated buttons and where to put them is a little haphazard. On the top-left of the camera, and accessible even when the panel is closed, are buttons for backlight compensation, fade, and edit search – which automatically rewinds and plays the past three seconds of video before returning you to the exact same spot on the tape. There's also a dedicated button for displaying a picture-in-picture inset of the original image when one of the digital effects is in use. It would surely have made more sense to put the Program AE button here.

Day-to-day use served only to highlight further shortcomings. The camera has real difficulty maintaining white balance both when it's first switched on and when moving between different environments. This was most obvious when moving from outside to an artificially lit room and vice versa. In the first instance, colours appear overly warm – white walls were an unsubtle shade of peach. Conversely when you go

outside it's very much a case of the wide blue yonder.

You can set the white balance mode specifically for indoor or outdoor environments, or fix it on the current setting – which allows you take a reading from a 'white' surface at the shooting location, but it's no compensation for the poor performance of the auto function.

The digital image stabiliser was ineffectual which, given the visible reduction in image area seen in the viewfinder, is doubly irritating. Manual focus is activated by a button just forward of the LCD panel and this is straightforward and simple to use – just push the button and turn the focus wheel mounted below it. It's a shame there isn't the same kind of direct manual control of aperture and shutter settings accessed from the OSM, but at this price it's fairly remarkable they're included at all.

Further disappointment was in store when we connected the Samsung camera to our video-editing PC. While device control operated perfectly well, we were unable to display or capture a satisfactory image and were treated instead to a pixellated scramble only barely recognisable as our test footage.

This problem, which also occurred with the JVC and Thomson camcorders, is caused by the Microsoft plug-and-play drivers recognising the camcorder as an NTSC, rather than a PAL device (see boxout p201). While some FireWire card manufacturers recognise this problem and give advice on how to overcome it (Pinnacle, for example provides a utility to switch between the Microsoft and Texas Instruments driver), camcorder manufacturers seem happy to ignore the issue.

Full credit to Samsung for attempting to bring down the cost of DV by entering the market with a budget camera, but as a first effort it falls woefully short of the mark. Next time Samsung would do better to concentrate on the basics – good-quality components, functions that work, intelligent layout of controls and, of course, a DV-input. In the meantime spend a few pounds extra and get a lot more for your money with either the Panasonic or JVC.

DETAILS

PRICE £630 (£536.17 ex VAT)

CONTACT Samsung 020 8391 0168

www.samsungelectronics.co.uk

PROS Budget price

CONS No DV-in; tiny black and white viewfinder; poor white balance

OVERALL For a little more money you can get a lot more camcorder. Check out Panasonic and JVC

FEATURES PERFORMANCE ★★★★★
EASE OF USE ★★★★★
OVERALL RATING ★★★★★



Sharp VL-SD20H



LIKE THE JVC DVX-10, the Sharp VL-SD20H is a marked departure from the 'standard' miniDV camcorder format adopted by most of the models reviewed here. As anyone who has seen a ViewCam will understand, compactness is not the only goal, rather a different approach to the way we use a camera. Sharp was first to introduce LCD panels for viewing and composing, rather than as an adjunct to a conventional viewfinder.

The ViewCam is really two components connected by a hinge that rotates through about 270 degrees. On the right the lens assembly houses the battery and provides a moulded hand grip. The bulk of the camera, which can be supported with the left hand, houses the cassette transport, video heads, 3in LCD panel and function controls.

All the important buttons are within easy reach of your right thumb – record/pause, still picture and zoom rocker switch. There's also an unusual three-way L-shaped power button that sets camcorder or VCR mode.

Below the LCD panel, four VCR buttons provide playback control and double as selectors for the OSM in combination with a push/rocker switch controlled with your right thumb. The camera has one menu that operates conventionally – you press the push/rocker switch and scroll through to activate the options.

Virtually all other options are set using the VCR control buttons to select options that appear in a horizontal menu bar on the LCD panel above them. In this

way you can quickly select one of the seven picture effects or four AE modes and set manual focus and exposure. Compared with the on-screen menu and push rocker selector system, commonplace on many other models, the Sharp method is easy to get the hang of.

In use, the SD20H was reliable, if a little unexciting. You either love or hate the ViewCam format. Our overall impression is that both the shape and rotational hinge make it feel less stable than a conventional model. Picture quality was excellent with the auto white balance coping well in all situations and the autofocus consistently finding its target. Motor noise was audible during recording, though, and was picked up by the mic on top of the LCD section which houses the cassette drive mechanism.

This is not the camera for you if you rely on the LCD panel as a front-of-camera monitor during shooting. First, you can't mount the camera on a tripod because in this configuration the tripod bush is pointing skywards – you need a special optional adaptor. Second, because many of the menu options co-opt the VCR buttons and panel menus, these too are non-functional when the panel is rotated 180 degrees.

For AE modes, say, and special effects, you can set them first, then rotate, but there's no manual focus, exposure control, or fade in this configuration. Given these limitations, it's hard to understand why Sharp didn't put some of these functions on the

remote, rather than those you're more likely to set on the camera.

The still picture button freezes the image on screen where you can view it before deciding to record it to tape, either for a preset six seconds or indefinitely and a strobe option records and displays nine or 16 still frames at tenth-of-a-second intervals. With no self-timer option why hasn't Sharp included a still picture button on the remote?

The absence of a viewfinder turned out to be less of a problem than expected. The LCD panel backlight automatically adjusts depending on the ambient light conditions and can be forced to bright mode if necessary. With the sun shining over your shoulder directly on to the panel it's possible to see the image reasonably well using your left hand to shade it. With the backlight in normal mode the camera consumes a hefty 4.8w, so a spare battery could be an indispensable extra.

DV editing was no problem – once we had located the FireWire socket by rotating the panel through 90 degrees and looking on the side usually obscured by the lens section. This socket is DV-out only, ruling out the ViewCam for anyone interested in desktop video editing.

If you prefer to use an LCD screen to a conventional viewfinder you may find the ViewCam format to your liking. In the absence of a conventional viewfinder Sharp has made efforts to ensure that its LCD panel is visible in circumstances where others would struggle.

However, the swivel-hinged construction creates problems that have been overcome in an awkward fashion. With the tripod mounting on one half of the camera and the lens on the other, instability is inevitable. If you want to face the LCD panel forwards while shooting, you need to use an add-on tripod mount, which only compounds the problem. Finally, in this configuration you lose most of the OSM functions. All of this so that you can adjust the angle of the viewing screen independently of the lens. This may have been revolutionary five years ago, but these days most other models do it – without the compromises that Sharp has made.

DETAILS

PRICE £700 (£595.74 ex VAT)

CONTACT Sharp 0800 262 958

www.sharp.co.uk

PROS Easy to use

CONS No DV-in; motor noise; limited front-panel functions

OVERALL The ViewCam design is at the root of all this camera's problems from noise to the ridiculous tripod adaptor for 'self recording'

FEATURES	★★★★
PERFORMANCE	★★★★
EASE OF USE	★★★★★
OVERALL RATING	★★★

Sony DCR-TRV20E



THE SONY TRV20E is a step up from the other camcorders in this group test. At nearly £1,200 you'd expect it to offer a lot more than models costing half the price, and you'd be right. In terms of build quality, specifications and features, the TRV20E has more to offer, but many of these features will only be of interest to the serious videographer.

The first thing you notice about the TRV20E is that it's weighty and robust. It's the only model that was supplied with a lens hood, giving it more of a professional look as well as keeping flare at bay. Behind this is mounted a proper focus ring on lens bevel. The thumb-operated power switch has four positions: off, VCR, camera and memory. The last of these lets you record still pictures to the 4MB Memory Stick. The maximum resolution of 1,152 x 864 doesn't come close to the resolution of a good digital still camera, but is far superior to anything you can capture on a DV tape. You can also produce digital mixing effects using the Memory Stick images – but more about that later.

Opening the LCD panel is something of a shock if you're not prepared – it's enormous. Measuring 3.5in diagonally compared with the more usual 2.5in and cramming in nearly a quarter of a million pixels it's ideal for those who intend to do a lot of shooting in widescreen 16:9 format. When opened it reveals a multitude of buttons on the inside panel. Sony seems to prefer physical buttons for many functions other manufacturers implement on the OSM

and there are additional ones for the Memory Stick functions.

Six buttons at the top of the panel are for playback and editing of digital stills on the Memory Stick, three in the middle toggle display information and another group lets you add digital effects and basic titling and provides access to the OSM. The LCD panel has a wide range of brightness adjustment which, like the volume, is controlled by, you guessed it, more buttons. The display itself provides the best monitoring and playback view you're likely to get without resorting to a separate monitor. As well as the usual three-portion battery graphic, you are given an estimate in minutes of the remaining battery life, which means you should never experience an unexpected power loss.

In use, the TRV20E is versatile and responsive. In point-and-shoot mode it gets on with the job, providing a clear, bright image with natural-looking, slightly warm, but not over-saturated colours. Sony's Super Steady Shot image stabiliser was the best we saw – no doubt due to the pixel-packed CCD sensor.

Whereas many of the cheaper models require a good deal of configuration for manual operation, the TRV20E lets you easily switch over mid-shot. For focus, a slider switches from auto to manual and a further push forces the focus to infinity – any subsequent moving of the focus ring automatically returns you to manual focusing. An exposure button on the

rear-left activates manual exposure mode and you use the OSM selector wheel for aperture control.

The TRV20E provides plenty of still picture features. You can shoot stills either to the DV tape, or the memory stick, though the latter provides better quality. Because a serial link and software is provided you can download pictures from either source to your PC. In-camera chroma key and luminance key features let you substitute a memory stick image for areas of the video image. For example, you can take a still picture of someone holding a blue board and then superimpose video footage on to it, or shoot video of someone in front of a blue background and substitute a still image in its place.

In-camera effects are good, but limited compared with what can be achieved on a PC. The TRV20E provides all the connectivity options you're likely to need or want. Of course, there's an IEEE 1394 port and this can be used to download digital video to a hard drive on your PC. The Sony device functioned without problems allowing us to capture using device control. The camera's A/V port is two-way, effectively turning it into a VCR capable of recording from both digital and analog sources. If you're fussy about picture quality you can plug the TV in and use it to video *Eastenders*. But this port is more likely to be of interest as a means of converting a library of analog video tapes to DV format.

You simply connect the S-Video or composite video output of your old analog camcorder to the Sony's A/V input, press play on the former and record on the latter and sit back and watch the show.

Other tasty features in this camcorder include IR recording and optional cordless connection to your TV for playback. However, it's not the gimmicks that make the TRV20E such an outstanding camcorder, but the combination of rock-solid high-spec components, excellent auto and manual features and comprehensive digital and analog connectivity.

DETAILS

PRICE £1,150 (£978.72 ex VAT)

CONTACT Sony 0990 111 999

www.sony.co.uk

PROS Big screen LCD; Memory Stick digital pics; easy-to-use manual controls; analog input

CONS Expensive; a little heavy

OVERALL The obvious choice for those with movie-making aspirations and deep pockets

FEATURES
PERFORMANCE
EASE OF USE
OVERALL RATING

★★★★★
★★★★★
★★★★★
★★★★★



Thomson VMD5



THOMSON, PROBABLY best known for its TV, VCR and DVD products, is a newcomer to the camcorder market. It introduced six new models at the CeBit computer show, including the VMD5, reviewed here. The entire Thomson line-up is based on JVC models but, although JVC also does the manufacturing, this is more than a mere rebadging exercise.

The VMD5 is the biggest and broadest of all the models on test, but its rounded contours feel snug and the controls are positioned so that even those with small hands won't find themselves straining to get at the buttons other manufacturers put beyond their reach.

There are several aspects of the design that break with current conventions and fashion. The first is that the cassette loading mechanism projects not from the bottom (hooray!), but the rear of the camera. Hang on though, if the tape comes out of the back, where's the battery? Well, that goes on the right of the camera body and rests in your palm.

The words 'Large ColorView Screen' printed on the outside of the LCD panel are no idle boast, like the Sony TRV20E's, it measures 3.5in diagonally providing a much bigger and better view for both monitoring and playback. However, the view through the viewfinder was bright, with a lot of contrast and visibly pixelated and, like the Panasonic, uncomfortable on the eye after a few seconds. Moving round to the front, the final surprise – a built-in 3.6w video light.

Pretty much everything about the design and layout of the VMD5, both physical and electronic, is pleasantly surprising and evidence that considerable thought has gone into it. Little things come to mean a lot when you make use of them frequently, like the way the play, off, auto and manual thumbwheel is labelled on the back so you can see it without having to turn the camera sideways.

The OSM is accessed by a push wheel behind the zoom rocker and is easily operated with your index finger. The top-level menu lets you set focus, exposure, effects and AE modes, and sub-menus provide things like macro, sound mode and image stabilisation.

The menu loop scroll, so you can easily get back to the top of a long menu from the bottom item with just one click of the wheel. If you make a selection from the top-level menu the OSM disappears and if you select from a first or second-level menu the selector goes to the end button so you can quickly exit, or go back and change another setting. The push wheel also functions as a brightness control for the LCD panel, manual focus wheel and aperture control in manual exposure mode.

There are no buttons behind the LCD panel – you don't need any as most functions are controlled from the OSM. The rear panel houses VCR playback buttons and a three-way on/off/auto switch for the light. All this swings open to the right to eject the cassette, which means you must first open the LCD panel.

In use, the camera performed very well. The autofocus in particular was quick and precise under most conditions, including low-light levels, and coped impressively with difficult situations such as shooting through Venetian blinds and dirty windows. When the light is set to auto it has a tendency to switch itself on in conditions where you would probably be happy to do without it, but using the rear-mounted switch you can easily turn it off. The illumination it provides is good for subjects between one and three metres from the lens and it's a good idea to set the white balance to lamp mode.

Outside the lamp is not much use as the illumination falls off rapidly, but for birthday parties, self-recording and other indoor low-light situations it's a big plus.

The image stabiliser was effective in the optical zoom range and beyond. Rather than smoothing movement, like the Sony TRV20E, it almost eliminates small movements altogether and translates larger movements into little jerks. In other words, it works at its best if you can hold the camera quite steady.

As with all of the digital image stabilisers, you need to have realistic expectations – it will dampen your worst jitters, but if you want real stability you're going to need a tripod.

Full marks to Thomson for including a serial cable for transferring still images to your PC (a privilege for which Panasonic charges £140) and a copy of Picture-it 99. There's also a copy of JVC's JLIP video capture and editing software. It's also good to see a manufacturer include a DV tape. But, if you're going to make extensive use of the built-in video light, an extra fully charged battery is a necessity.

Unsurprisingly, we had the same video-editing problems with the VMD5 as with the JVC camcorder and had to switch to the Texas Instruments camcorder driver in order to capture digital video to a PC using the FireWire port. Once done, everything worked fine and we were able to capture, edit and record back to the camcorder using device control from Ulead Media studio.

DETAILS

PRICE £850 (£723.40 ex VAT)

CONTACT Thomson 01732 520 920

www.thomson-europe.com

PROS Bigger than average LCD screen; built-in video light

CONS Bulky, uncomfortable viewfinder

OVERALL Clever design that shows good attention to detail. The built-in light comes in handy for indoor shooting

FEATURES	★★★★★
PERFORMANCE	★★★★
EASE OF USE	★★★★
OVERALL RATING	★★★★

DV editing denEUtered

Although DV camcorders have been around for nearly two years now, it's only in the past few months that models capable of recording digital video from an external source (ie your PC) have started to appear. This is not because it's technically difficult, or expensive, in fact camcorders destined for the European market have had their DV recording capability deliberately disabled – a process that has become known as nEUtering.

Why do the manufacturers do this? Because otherwise DV camcorders would be classed as VCRs and attract additional tax that would be passed onto you the consumer. Whatever you think of the rights and wrongs of this, clearly most manufacturers believed that European consumers weren't too interested in desktop video editing and those that were would be prepared to pay extra (about £25) for the privilege.

Thankfully, they've been proved wrong, largely by means of a thriving underground trade in software, and hardware 'widgets' designed to restore the nEUtered machines to their full DV-in potential.

So camcorder manufacturers have got the message and now, for a small extra charge you can get a DV-in model just about anywhere... well, not quite. For one thing, some have been slow to catch on – two of the models we've reviewed here are nEUtered, the Samsung VP-D55 and Sharp VL-SD20H. And some manufacturers are charging a hefty premium for DV-in versions of their nEUtered models, the Canon MV300i being but one example.

DV-in is important because, having downloaded DV footage from your camcorder to your PC and edited it you'll want to get it off your hard drive to a cheap digital storage device – and where better than the place it came from? DV eats up disk space – you could fill

a 20GB hard drive with the contents of one 90-minute miniDV cassette, so at less than £7 each they compare very favourably with other forms of storage.

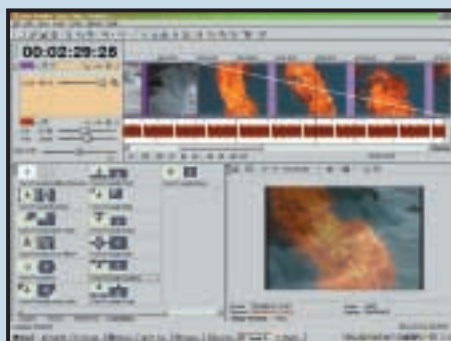
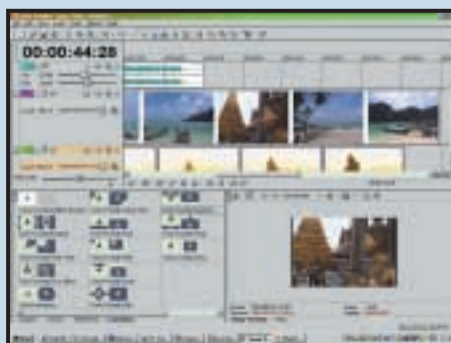
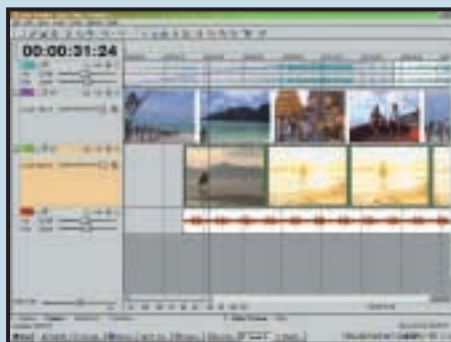
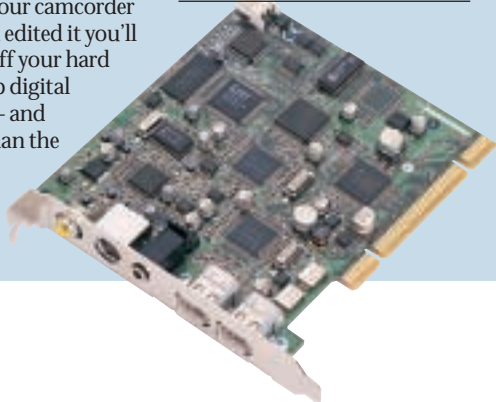
Recording your video back to the camcorder also provides an easy route to making analog copies of your digital master using the camcorder's composite, or preferably S-Video socket to connect to a domestic VCR.

To edit digital video on your PC you'll need an IEEE 1394 FireWire interface card and software that enables you to capture video clips from your camera, assemble and edit them, then record the finished project back to tape. If you don't already have a FireWire card, choose one with several ports – so you can connect an external hard drive, or scanner, as well as the camcorder.

Several manufacturers sell packages consisting of a card and software. Pinnacle Systems' Studio DV, the ADS Pyro 1394 and UK company Datavision's DV Capture are all reliable boards with application software offering good value, see *PCW* June 2000 p147.

One advantage of buying a FireWire board with bundled software is that you shouldn't suffer any compatibility problems between the two. Making sure your board and camcorder work in harmony is, however, another issue. Three of the camcorders in our group test – the JVC GR-DVX10, Thomson VMD5 and Samsung VP-D55 all exhibited the same problem when trying to display and capture digital video connected to a PC using an OHCI-compliant FireWire card. Instead of clean crisp

Pinnacle's FireWire interface card (see reviews)



You can produce amazingly professional results using a DV camera and digital video editing software such as Vegas Video from Sonic Foundry








digital video they displayed an almost unrecognisable jumble of pixels that could no way be coaxied into a stable image.

Our video-editing machine was an 800MHz Athlon running Windows 98SE with an ADS Pyro 1394 card. The capture and editing software was Ulead Media Studio 6 and the system had been used successfully for many months with a DV-enabled Panasonic NV-DA1. It also had no problems with the other camcorders in the group test.

This is a problem JVC owners with DataVision boards have been aware of for some time and DataVision has published a software patch on its website www.datavision.co.uk. The pixel soup is the result of the camcorder being identified as an NTSC rather than a PAL model. We

managed to work around the problem by replacing the Windows 98 Microsoft camcorder driver with a Texas Instruments one. Pyro owners can obtain the TI camcorder driver from www.adstech.com/resources/pyro.html.

Unless you're lucky, you can expect to spend some time ensuring that your setup works perfectly and you are able to both capture and record digital video without problems. If you're planning on buying a camcorder to use with an existing setup, or would like to find out which FireWire card/editing applications/camcorder combination might give rise to problems, then the best sources of information are the websites for the card and software manufacturers, as well as video-editing newsgroups.

Table of features							
	MANUFACTURER	CANON	JVC	PANASONIC	SAMSUNG	SHARP	SONY
PRODUCT	MV300i	GR-DVX10	NV-DS150	VP-D55	VL-SD20H	DCR-TRV20E	VMD5
Telephone	0800 616 417	020 8208 7654	08705 357 357	020 8931 0168	0800 262 958	0990 111 999	01732 520 920
URL	www.canon.co.uk	www.jvc-europe.com	www.panasonic.co.uk	www.samsung-electronics.co.uk	www.sharp.co.uk	www.sony.com	www.thomson-europe.com
Price inc VAT	£730	£1,300	£650	£630	£700	£1,150	£850
Price ex VAT	£621.28	£1,106.38	£553.19	£536.17	£595.74	£978.72	£723.4
FEATURES							
CCD	.25in 540,000 pixels	.25in 680,000 pixels	.25in 800,000 pixels	.25in 800,000 pixels	.33in 770,000 pixels	.25in 1,070,000	.25in 800,000 pixels
LCD screen	2.5in TFT colour 112,000 pixels	2.5in TFT colour	2.5in 112,000 pixels	2.5in TFT colour LCD 112,000 pixels	3in TFT colour LCD	3.5in colour LCD 246,400 pixels	3.5in colour TFT
Viewfinder	0.44in TFT colour LCD 11 113,000 pixels	.44in colour LCD	Colour LCD	0.24in mono LCD	None	Colour LCD	0.55in colour LCD
Focus	Auto/manual	Auto manual	Auto/manual	Auto/manual	Auto/manual	Auto/manual	Auto/manual
Zoom (optical/digital)	10x/200x	10x/200x	20/400	22x/440x	10x/100x	10x/20x	16x/320x
Image stabiliser	✓	✓	✓	✓	✓	✓	✓
Still picture	✓ (cable not supplied)	✓	✓ (cable not supplied)	✓ (cable not supplied)	✓	✓	✓
Sound	16bit 48KHz or 12bit 32KHz	16bit/48KHz or 1bit 32KHz	1bit/48KHz or 1bit 32KHz	16bit/48KHz or 12bit 32KHz	16bit 48KHz or 12bit 32KHz	16bit/48KHz or 12bit 32KHz	16bit/48KHz or 12bit 32KHz
Effects	Art, black & white, sepia, snow	Twilight, sepia, B&W, classic film, strobe, video echo, plus assorted fades, wipes and dissolves and MP3 digital sound effects.	Wipe, mix, strobe, neg, sepia, B/W, tracer, solar, mosaic, mirror	Neg, B/W mosaic, mirror, ghost	B&W, sepia, mosaic, solarise, stretch, slim, neg	Neg, sepia, B&W, solarise, slim, stretch, pastel, mosaic	Sepia, B&W, Twilight, echo, classic film, strobe, fade, wipe
Ports	IEEE 1394 DV in/out, S-Video out, A/V out (comp video, stereo audio), LANC, mic, phones	On camera: IEEE 1394 DV in/out, A/V out. On docking station A/V out (comp video, stereo audio), S-Video, Digital Still Picture (serial), JLIP edit, printer, mic	IEEE 1394 DV in/out, S-Video out, LANC, mic, AV out (comp video, stereo audio) Digital still picture (serial)	IEEE 1394 DV out, A/V out, S-Video out, mic	IEEE 1394 DV out, S-Video out, A/V out (comp video, stereo audio), mic, still picture (serial)	IEEE 1394 DV in/out, S-Video out, A/V in/out (comp video, stereo audio), LANC, mic, phones	IEEE 1394 DV in/out, S-Video, JLIP, PC serial, A/V out (comp video, stereo audio)
Dimensions (mm w x h x d)	57 x 101 x 129	51 x 125 x 97	80 x 100 x 195	155 x 90 x 75	158 x 98 x 74	71 x 93 x 170	188 x 118 x 88
Weight (ex battery and tape)	550g	515g	520g	650g	555g	680g	710g
Accessories	Remote control, shoulder strap, lens cap, battery pack, mains adaptor/ charger, S-Video cable, A/V cable Scart adaptor, ferrite cores	AC adaptor/mains lead, battery pack, docking station, remote control, 8MB MultiMedia card, Scart adaptor, A/V cable, editing cable, JLIP cable PC cable, CD with JLIP video capture and editing software	AC adaptor/mains lead, battery pack, AV cable, S-Video cable, shoulder strap, remote control, head cleaner, lens cap	Battery, AC adaptor/ charger, A/V cable, remote control, S-Video cable, Scart adaptor	Battery, AC adaptor/charger, remote control, FireWire cable, A/V cable, S-Video cable, lens cap, DV tape	Remote control, mains adaptor/ charger, battery pack, PC serial cable, memory stick, A/V cable, Scart adaptor, lens hood and cap, and cap, PictureGear 4.1 Lite software	Battery pack, AC adaptor/ charger, remote, S-Video cable, A/V cable, serial cable JLIP editing cable, Scart adaptor, JLIP software, Picture It! 99, DV tape



Editor's Choice



Take away all the frills and features and fundamentally what a camcorder does is to record and display video. All the models we reviewed make an excellent job of this with the possible exception of the Samsung VP-D55 which, even despite its shortcomings can be made to produce reasonably good results.

When deciding on the Editor's Choice we first took into account each camera's features. Perhaps the most important of these was the capability to download video to a PC over FireWire (IEEE 1394) and then record back edited video footage. For too long European DV camcorders have had their DV-in port disabled, pointlessly crippling one of the most exciting features on offer. Unless you can record your video projects back to DV tape on the camcorder there's nowhere for them to go except the Recycle Bin. At 1GB for under five minutes of video you certainly won't want to leave them on your hard drive for too long.

A IEEE 1394 interface also allows you to control your camcorder's VCR functions from video editing and capture software. This makes capturing clips from the DV tape in your camcorder much easier and is absolutely essential for batch capture. If you have a lot of clips to capture you can view the entire tape, marking in and out points where you want capture to begin and end. The software then locates the relevant point on the tape, plays the marked segment and captures it to disc before fast forwarding to the next bit – all while you sit back and watch.

A problem with the Microsoft camcorder drivers resulted in scrambled video using the JVC, Thomson and Samsung models, but once we found the solution (which came from the FireWire card manufacturers) this was easily sorted out. Apart from this one problem all of the camcorders performed straight out of the box when connected to a PC.

Ease of use is, of course, important and what differentiates the excellent from the merely functional is the way in which features like auto focus and exposure, white balance, digital image stabilisation, Program AE modes and so on have been implemented.

In day-to-day use it matters more that you can easily switch from auto to manual focus, or instantly compensate for backlit subjects when the situation demands, than being able to shoot in black and white, sepia, negative or any one of a dozen special effects on offer.

All of the camcorders we looked at provided some form of still picture function. At its most basic this records a 640 x 480 digital still picture to the DV tape which you can transfer using a (not always supplied) serial cable and software. A new trend is emerging, where still images are recorded to a multimedia card. Both the Sony TRV20E and the JVC GR-DVX10 take this route.

Effectively, this gives you two cameras in one, doing away with the need to carry a second camera for stills. While camcorder CCDs are no match for dedicated still picture cameras, at resolutions of around one megapixel, the images they produce are more than

good enough for the web, can be inkjet printed with good results up to 6 x 5in and reproduced in a magazine at half that size.

The winners

The **Editor's Choice** award goes to the **Sony TRV20E**. About the only negative thing you can say about this superb model is that its price puts it out of the reach of most of us for whom video is an amateur pursuit. The Sony's build quality is excellent – it looks and feels like it could stand up to rough handling without serious consequences. Every component, from Carl Zeiss lens to the megapixel CCD and the 3.5in LCD panel, is built to the highest specification. The result is clarity of view and quality of images that are significantly better than the cheaper cameras.

For those who want to venture beyond automatic point-and-shoot operation the Sony provides the best manual features. Thumbwheels are all very well for operating OSMs but you can't beat a proper lens-mounted ring for manual focusing. Switching into manual from the Sony's auto mode is as simple as flicking a switch and the infinity focus option is the inspired design of someone who's actually fumbled with a focus ring and thought 'there's got to be a better way'.

As a still camera the Memory Stick gives it the edge in resolution and versatility over capture-to-tape devices, though it still falls short of the capabilities of a dedicated digital still camera. Nonetheless in a news gathering role or any situation where quick on-scene editing is the only option, these could prove invaluable. As with the JVC DVX10 the multimedia route is clearly the future for digital camcorders.

Those of us with more modest budgets could do very much worse than the **JVC GR-DVX10** which gets our **Highly Commended** award. The DVX10 is only slightly bigger than many digital still picture cameras, yet provides much of their functionality as an added extra.

You may not make use of them all, but the DVX10 also has the widest range of special effects and transitions as well as sound dubbing features. Lastly, its ultra-compact design makes it a good choice for situations where size is important or when you just don't want the bulk of a conventional camcorder.



Sony's DCR-TRV20E is a superb camcorder and the price reflects the specs



JVC's GR-DVX10 is very compact but has a wide range of functions and special effects

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The need to record data has been with us for thousands of years, but the way we do it has changed dramatically. This month's *pcwexpert* focuses on office suites. And our workshops will help you get familiar with some of the packages that make up these all-in-one offerings

office suites

Written by Tim Anderson, Tim Nott, Stephen Wells,
Mark Whitehorn, Simon Williams & Janet Heil

PHOTOGRAPH PATRICK LLEWELYN-DAVIES

From clay tablets to integrated suites

The Egyptians used clay and wax tablets to keep records, today we can rely on sophisticated all-round software packages

The sort of tasks you expect an integrated office suite to help you with have been done in some form for thousands of years. An official at the court of an Egyptian Pharaoh, 3,000 years ago, could well have recorded transactions such as provisioning or personnel movements. He would have used clay or wax tablets for what was essentially a database function, but could also have used papyrus rolls to pass on information. In sending a letter like this, he was performing the same sort of function you might in sending an email stationery order.

These kind of jobs have always been done, first on wax and later by pen and paper. All kinds of documents have become increasingly essential as society has grown more complex. The introduction of the printing press during the 1450s made it possible to create duplicates of important documents, mainly books, much more easily. However, it wasn't until the invention of a commercial typewriter, by Scholes and Glidden in 1874, that printed documents could be created by anybody for little more than the cost of the machine.

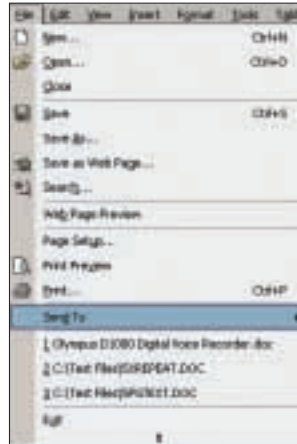
The typewriter made it easy to write letters, send bills and

produce all kinds of other documents. At last, you could be sure your letters were legible and you could produce duplicates with nothing more complicated than a sheet of carbon paper.

The typewriter continued as the most useful piece of office machinery for over a century until the release of the personal computer. Coming from another thread of technology, the PC was a couple of steps on from the very earliest electronic computers. From code-breaking efforts in the Second World War, the first commercial use of a computer was made by coffee house chain J Lyons in 1951. The company developed the Leo 1 to handle the payroll and sold subsequent versions to companies such as Ford and to the civil service.

By the time computers had developed far enough to fit on a desk, 8bit machines running the CP/M operating system were pushed into service for the same kind of office tasks we perform today. They were required as typewriter replacements for producing letters, holding details and for keeping accounts.

Commercial programs sprung up to fill a growing demand and WordStar became the best-known word processor. At about the same time Visicalc arrived.



Now fully mature, the applications in Microsoft Office work well together, from a starting point as completely separate programs less than 10 years ago

Visicalc can claim to be the only completely new application to have come out of the personal computer age. Word processing, databases and desktop publishing all have manual equivalents in typewriting, card indexes and page layout. The kind of 'what if?' analysis that can be done on a spreadsheet, though, which is what Visicalc was, could only be achieved on a computer.







With the launch of the IBM PC in 1981, using MS-DOS (actually PC-DOS in the IBM version), there was a move by all

the leading software makers to transfer business applications onto the new machine. Although this happened to WordStar, the code for Visicalc was sold to Lotus and used in the development of the next major player in the spreadsheet world, 1-2-3. WordStar was undergoing a face-lift to WordStar 2000, which never caught on and MicroPro, its creator, never really recovered.

These big program monoliths were aimed at business and priced to match, but there was a growing demand for 'all-in-one' programs at the cheaper home and small-business end. Several companies saw an opportunity and by the time the Amstrad PC was launched in 1987, a move that kickstarted the UK PC business almost on its own, there were several integrated programs around, including Ability, and PC Four from Psion, now much better known for its PDAs.

Microsoft Works was launched at the end of 1987, at a price of just £167. For this you got a word processor, spreadsheet, database, graphics program and basic communications. The elements of true integration were already in place, with facilities to incorporate a graph or section of a spreadsheet into a word processor document and to

pcwexpert timeline

c1000BC	c1500	c1800	1874	1951	1978
					
One of the earliest forms of portable written documents was Egyptian clay and wax tablets, marked with stylus and used for record keeping.	Vellum (animal skin) and then paper were used in the Middle Ages to hold details of all kinds of transaction, and important correspondence.	Once bound books were relatively cheap, all kinds of records were notated by hand in ledgers. Banks relied on teams of clerks to record transactions.	Commercialised at the end of the 19th Century, the typewriter was a personal means of printing. It was used for everyday business correspondence.	The first commercial use of a computer was by J Lyons, the coffee-house chain, which computerised its accounts with the in-house designed Leo 1.	The first and greatest 'killer app' was Visicalc, a spreadsheet designed to run on the Apple II. The fundamental concept was of an electronic ledger.

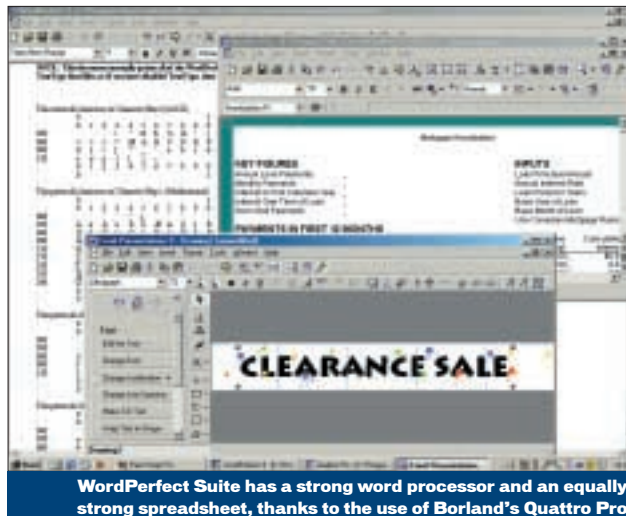
create graphs from spreadsheet data. At this stage, the program didn't use a graphical interface, though, relying on pseudo menus and slider bars, built entirely on text screens.

The arrival of Microsoft on the scene encouraged other players and soon LotusWorks and WordPerfect Works had joined in. All three products had strengths and weaknesses, but Microsoft, perhaps because it had seen the potential first, remained the market leader.

The idea of combining heavyweight apps into an all-in-one package was also Microsoft's. It combined Word, Excel and PowerPoint into Office and set it at a lower price than you would pay for just two of the standalone applications. To anybody setting up an office PC, this proved very attractive and Microsoft went one step further, offering Office to PC manufacturers so cheaply they could afford to bundle it with some new machines.

WordPerfect and Lotus were now playing catch-up. They put together their own integrated suites, though both had to buy in apps they didn't already have. Lotus bought Ami Pro from Samna and used it as its word processor, while WordPerfect teamed up with Borland to license Quattro Pro as the spreadsheet in PerfectOffice.

These hastily gathered components didn't always work well together and integration wasn't a strong point of the early



WordPerfect Suite has a strong word processor and an equally strong spreadsheet, thanks to the use of Borland's Quattro Pro

Lotus and WordPerfect suites. Microsoft, on the other hand, was writing all the components in-house and its programming teams worked together to ensure better sharing of resources.

There was also more equality between applications. Word, Excel and PowerPoint were already well-known programs. WordPerfect – the word processor – was well known too, but some of the other programs were not such big household names. Lotus did better with Ami Pro, 1-2-3 and Freelance Graphics, combining them all into SmartSuite.

By 1995, WordPerfect – the company – was not doing well, having not made the transition to Windows smoothly, it was still trying to make a living from its relatively strong DOS presence. In the end, it sold the suite to Novell.

With its main expertise in

networking, Novell thought PerfectOffice would fit quite well into its portfolio. It was used to selling into large corporate markets and this was also where a lot of WordPerfect's sales were. Novell's take on PerfectOffice comprised WordPerfect, Quattro Pro, WordPerfect Presentations, InfoCentral (a PIM), Envoy (a one-time rival to Adobe's Acrobat), and GroupWise, an email and scheduling tool.

Novell struggled with WordPerfect for 18 months before returning to its networking roots. It found a keen buyer in the Canadian Corel Corporation, which had been trying to build WordStar for Windows into its own integrated suite.

Corel bought WordPerfect, abandoned the WordStar project and launched WordPerfect Suite 7 towards the end of 1996. The

suite has since been improved, with the addition of the heavyweight Paradox database to the professional version, for instance, but it has only enjoyed limited success. However, it still sells well into specialist markets, such as the legal profession, in the US.

SmartSuite has done better with the second largest market share for integrated suites. However, this has been achieved largely by being offered very cheaply to PC manufacturers.

Lotus was bought by IBM in 1997, and has since run largely unaltered, other than the introduction of IBM's ViaVoice voice recognition into SmartSuite. The suite now comprises Word Pro, 1-2-3, Freelance Graphics, Approach (a database), Organizer, Fast Site (intranet document publisher), ScreenCam (a recording tool) and ViaVoice.

Now, Microsoft owns the lion's share of integrated and works suite markets. Works has effectively killed off all its rivals and is the only small-business integrated package offered in any numbers. Office enjoys a similar position in the full office suite market, with SmartSuite some way behind and WordPerfect Suite only a minor player in the UK.

The market for individual applications has almost dried up. These days most people are happy to buy the full integrated suite, even if they won't use all the modules.

1978	1983	1987	1990	1994	2000
WordStar was the first popular word processor, starting on CP/M-based computers and moving on to MS-DOS with the advent of the IBM PC.	Lotus made its name and fortune on the strength of one product, the spreadsheet 1-2-3, developed from Visicalc. It migrated from DOS to Windows.	Microsoft conceived Works as an integrated suite, including word processor, spreadsheet and database. Other applications got added along the way.	Although the DOS version wasn't a major rival for WordStar or WordPerfect, Word for Windows was bigger and is now the mainstay of Office and Works.	When its parent hit troubles, WordPerfect was sold to Novell, but even as part of WordPerfect Office, Novell couldn't make a go of it and sold it to Corel.	Now the best known integrated suite in the world, Office outsells SmartSuite and WordPerfect Suite put together. The next step will be Office.Net.

Word processors

Over the next five pages we dig into the main elements within leading office suites and ask what separates one from another. We start with word processors

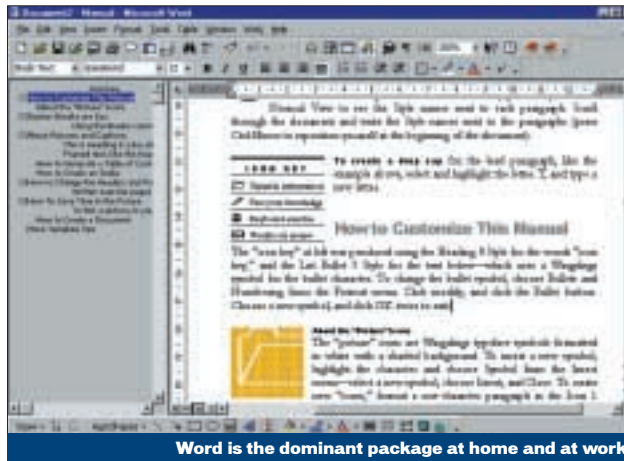
There are four heavyweights in the word processing arena, each with their own strengths and weaknesses. First, though, let's look at the common ground.

In terms of editing and proofing, each package offers a WYSIWYG view, drag-and-drop editing, and 'smart' quotes. All use styles where multiple formatting options can be applied with a single click. All will let you organise an 'outline' of nested heading levels, have numbered footnotes, and automate the creation of tables of contents and indexes. Again, all feature both 'as you go' spelling checks, with suspect words highlighted or underlined, and auto-correction of common mistakes, such as 'necesary' or 'teh'. Most will also check grammar, although none is infallible in this respect.

As far as page layout and graphics are concerned, many features that were once seen only in desktop publishing (DTP) and illustration packages are now standard in word processing. Newspaper-style columns, tables, drawing tools, text box-outs and call-outs, clip-art libraries and text that wraps around graphics, are all common to each of the best-known applications.

As well as creating documents for printing or sending as email attachments, you may want to publish them in HTML form: either on a website or a corporate intranet. Once again, each of the main players has that capability, as well as an 'online' editing view. Microsoft Word, however, has some extra tricks – see below.

No single interface and feature set can be all things to all users. All the applications here are open to customisation of menus and toolbars. They can also all be automated, either by 'recording' a sequence of actions and saving the recording for re-use, or by programming directly in a dialect of the Basic language. These functions, called macros, can be as simple as an instruction to change



Word is the dominant package at home and at work

the 'Save' folder when a template is loaded or can constitute a complex bespoke 'solution' for a corporate environment.

What about operating systems? If you're unlikely to be using anything other than PCs running Windows, this isn't an issue. However, two of the four products below run on the Linux platform, and Macintosh and OS/2 versions are available on one product each.

Microsoft Word 2000

Word's main selling point is that it sells. This self-fuelling situation is largely due to 75 per cent of its sales to corporate customers, meaning that Word skills are a must for any CV. Word is available for PCs and Macs.

Word 2000 broke with nearly a decade of tradition in abandoning the Multiple Document Interface (MDI) whereby several documents can be contained in the main application window: as seen in all other word processors covered here as well as the Office 2000 version of Excel. The new SDI (Single Document Interface) has not proved popular: it appears as if multiple instances of the program are running, and duplicated menus and toolbars waste a lot of screen space. The forthcoming release of Office 10 has restored the MDI option.

Another new feature of Word 2000 – the option to turn off the

irritating Office Assistant – met with a warmer welcome.

Although it's a suite-wide feature, rather than a Word-only one, the multiple clipboard is especially useful in word processing. Unicode support is another Word exclusive. Unicode is an international standard for assigning two-byte codes to the characters of all the world's written languages. Although few fonts contain all these characters, many have several different character sets as well as symbols not found in the standard ANSI set, such as fractions. The Windows Times New Roman font, for example, contains the Greek, Cyrillic, Arabic and Hebrew character sets. In the case of other word processors, special proprietary fonts must be used. This means there is no common standard for assigning

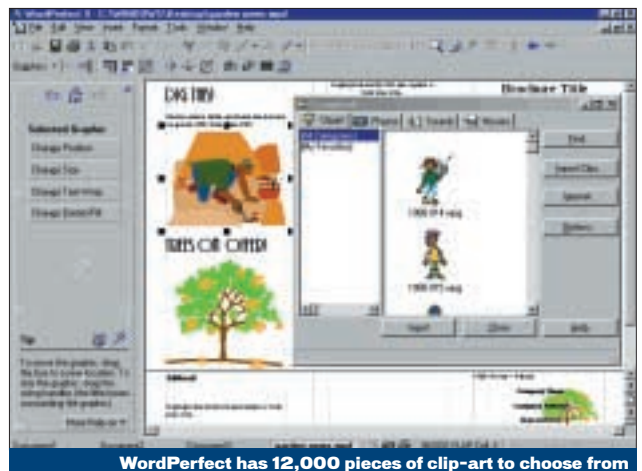
the characters, so the same custom font must be installed on other computers in order to read the document.

Another feature only found in Word is HTML 'round tripping'. Saving a document in HTML format will often cause it to lose some formatting, so Word embeds a binary copy of the document file as an XML object within the HTML code. So, although the document may look different in a browser, a bit-perfect original copy can be re-opened from the web page, directly into Word. Other web-enabled features include transparent uploading of documents to a web server via 'web folders' and online group collaboration.

Corel WordPerfect 9

Available for both Windows and Linux, WordPerfect comes with no fewer than 26 proofing languages and speech recognition as an option. The customary Corel largesse means you have a thousand fonts and 12,000 pieces of clip-art with which to embellish documents. There are also plenty of ready-made templates designed for use with PaperDirect stationery.

The interface is uncluttered, and this is largely due to the Property bar. Instead of having a profusion of toolbars for formatting text and graphics, the chameleon-like Property bar provides a one-stop solution.



WordPerfect has 12,000 pieces of clip-art to choose from

When you're editing text, it shows the usual controls for font, style, emphasis and so on. Select a graphic and the bar will change to show border, background, text wrap and other relevant options. Coupled with this is an (optional) assistant: the PerfectExpert slots in beside the workspace and offers step-by-step, context-sensitive advice that seems far more relevant and better-organised than that of the Microsoft Office Assistant or the Lotus equivalent.

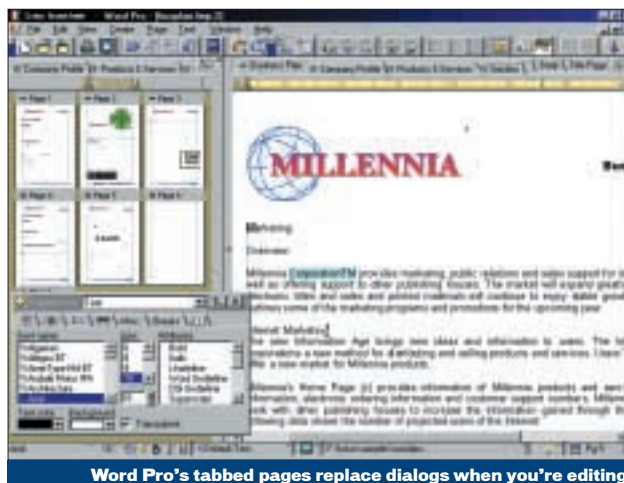
Another neat interface trick is Real Time Preview: select some text, for example, then scroll through the font list to preview the text in any font. Unfortunately, this doesn't work at style level, and it can also be rather slow. But it does save having to undo unsuccessful formatting experiments.

Although WordPerfect doesn't support Unicode directly, it does come with its own fonts in a variety of character sets including Cyrillic, Greek, Arabic, Hebrew and Japanese. Unlike StarWriter or Word Pro, it does a good job of importing Word Unicode documents and of substituting its own fonts for the non-ANSI ranges. It also offers a work-around to the problem of proprietary fonts, mentioned earlier, in that you can embed the font files into the document.

WordPerfect 9 doesn't quite match Microsoft's seamless web publishing, but it will let you create, edit, and save SGML or XML documents. For traditional paper printing, WordPerfect positively shines, with far more options than Microsoft offers.

You can print banners that span several pages, or booklets made from folded sheets: WordPerfect will work out the relationship between the logical page order and the order in which the pages should be printed.

WordPerfect has its own macro language and the suite also ships with Microsoft's Visual Basic for Applications, so aspiring (and actual) developers can have the best of both worlds.



Lotus Word Pro

Formerly known as Ami Pro, Word Pro is only available for Windows. It comes with IBM's ViaVoice voice-recognition software and 17 proofing languages. You also get a good selection of interactive 'SmartMaster' templates for business and personal documents.

Word Pro's interface takes a little getting used to – for example, the font and text formatting controls appear at the bottom of the screen and many of the 'SmartIcons' use unfamiliar images – but it's an interface that grows on you. The best feature is the Properties box. This works in a similar way to WordPerfect's Property bar. It doesn't dock, like a toolbar, so you may have to move or 'collapse' it to get at your entire document but it is extraordinarily versatile. When editing text, for example, you have seven tabbed pages, covering font, indent and alignment, bullets, borders, breaks, styles and miscellaneous settings. Select a graphic and the box options change accordingly; select the header or footer and you'll get the Page Layout options. Although this way of working takes a little getting used to, it is 'modeless' – that is, you don't have to keep opening and closing dialogs – and saves time hunting around in the menus. Other dialogs, such as the spelling checker, are also modeless, so you can keep them permanently open.

Although, unlike WordPerfect, it can't convert high

Unicode characters from Word documents, it will do the same trick of embedding fonts in documents to ensure that a recipient on a remote PC will be able to see the document as intended. However, the range of special fonts supplied is limited compared to WordPerfect, and on a related note, the clip-art library is also minimal.

Word Pro scores well on document management, with the option to show Divider Tabs at the top of the document. Divisions can contain sections of the same or different documents, or files inserted as OLE (Object Linking and Embedding) objects. Document divisions can be assigned different templates and divisions re-ordered by dragging the tabs around. Complementing this is a DTP-style Page Sorter view and, given sufficient screen space, you can combine this with a normal page view.

Finally, Lotus embraces the Internet with SmartMaster templates for both business and personal use, although it lacks the XML support seen in WordPerfect and Word.

Sun StarWriter

StarWriter's unique selling point is that it's free – if that's not a contradiction in terms. You can download it as part of StarOffice from Sun's website: alternatively there's a Deluxe CD version that comes complete with printed manuals at about £40. As well as Windows it's also available on the Linux, Solaris and OS/2 platforms. Nine proofing

languages are supplied, but only three can be installed at any one time.

The interface integrates tightly with the rest of StarOffice and the Windows desktop. An optional panel at the left of the screen is Star's own-brand Explorer. This gives a tree-like view of folders on your disk and the network, bookmarks to websites, Tasks – that is, new Star documents – and email. A further panel, the Beamer, sits above the workspace and shows the contents of folders as well as serving as a clip-art viewer. Both these panels can be tucked away with a single click, as can a help panel.

Despite being free, StarWriter doesn't lack features. There's a good set of drawing tools, a clip-art library, autocorrect and autoformat, charting and equation applets, and a macro language, although there's no grammar checking. Unlike the other applications, StarWriter doesn't have an outline editing view, whereby you can hide and reveal nested levels of headings and body text. Instead it has a Navigator palette: this not only shows headings and subheadings but can also be used to find pictures, OLE objects, bookmarks and hyperlinks in a document. One drawback with StarWriter is that it doesn't support font embedding, but this shouldn't be a problem to English or non-Greek Western European users. Internet support is good, with an integrated browser, online document view and a link toolbar.

One rather clever feature is the ability to select multiple, unconnected passages of text, which provides a quick way to apply local formatting as well as copying several passages of text at one time. There's also a 'click-and-type' feature similar to that in WordPerfect (and seen in a more limited form in Word), so you don't have to fiddle around with tabs and alignment. It comes with a good range of templates and 'Autopilots', which, like the Wizards seen elsewhere, give step-by-step choices on creating letters, memos and other documents.

Spreadsheets

Most packages offer similar functions enabling you to get the computer to do the hard calculations, but there are some differences. We help you to figure it out...

To perform multiple calculations across a range, using array formulae, you need Excel. For the widest variety of built-in functions, you'd go for Lotus 1-2-3. To record and calculate dates before 1900, you'd choose Corel Quattro Pro. For free software, there is Sun's StarCalc. But otherwise, all these leading spreadsheets offer pretty much the same facilities. It's just a matter of personal preference – like choosing a car.

Microsoft Excel

The features introduced in Excel 2000 were related to usability. Improved File Open and File Save dialog boxes display more files at one time, and access them faster. A new Places bar speeds up access to the folders and locations you use most, and a History file offers your most recent 20-50 Office files, in common with the other packages that make up the Office 2000 suite.

Sounds are back, too. In earlier editions of Excel, you could include a sound in a cell. Then Microsoft dropped the feature. But Excel 2000 lets you insert a sound object on a worksheet as easily as a graphic one: you can play cash register kerchings or include recorded comments.

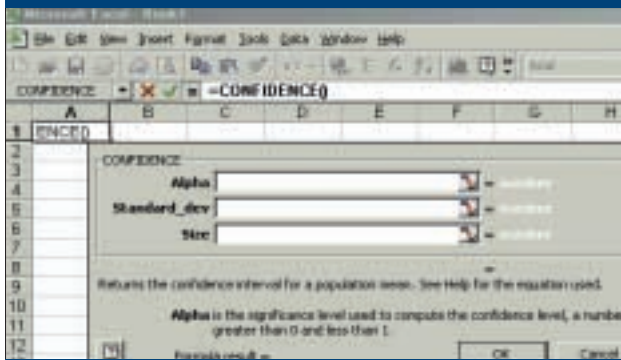
Select cells with coloured text, and the colour now remains the same instead of appearing in an inverse colour scheme. There are additional built-in currency and accounting formats using the euro currency symbol, and four-digit date formats so you know which century you're in.

Excel 95, 97 and 2000 were actually Excel versions 7, 8 and 9 respectively. It all comes together now with Excel 10 in Office 10. For spreadsheet users, it's a sensible upgrade if you are using Excel 97, but probably not to such an extent if you are already on Excel 2000. Oh, and it's incompatible with Windows 95.

Like Lotus SmartSuite Release 9.6, Excel 10 should have voice

	A	B	C	D	E	F
1						
2						
3		Com	Soybeans	Cottonseed		Units
4	Protein	0.25	0.40	0.20		22
5	Fat	0.40	0.20	0.30		28
6	Fibre	0.30	0.20	0.10		18
7						
8		-2.8571429	-3.0000000	5.7142857		
9		3.5714286	-2.5000000	0.3571429		
10		1.4285714	5.0000000	-7.8571429		
11			Protein	Fat	Fibre	
12	Com	40	10	15	12	
13	Soybeans	15	6	3	3	
14	Cottonseed	30	6	9	3	
15			22	28	18	Units
16						

Lotus 1-2-3 has the most built-in functions



Excel is best if you want to use array formulae

recognition. But most of the extra features are for increasing web integration. Excel will support XML as a native file format. Paste text from the web and a Smart Tag is displayed that lets you keep the source formatting, match the destination formatting or keep to plain text. Smart Tags work even if VBA scripting is disabled. That, incidentally, is a wonderful security feature. You or an administrator can install Excel 10 so that data can't be affected by VBA scripts.

Smart Tags may also offer pop-up information from the web, if you're connected. Enter a stock code on a worksheet and a pop-up box could offer more details to paste in if required.

There will also be a Corrupt Document Recovery feature. Currently there are add-ins that will attempt this but Excel 10 starts correction automatically as soon as there is an application error.

The Clipboard used with Excel 10 will allow copying of 24 objects. AutoCorrect becomes

more intelligent. If it changes something you have entered, and you change it back, AutoCorrect will learn not to make that correction again.

Lotus 1-2-3

Since Lotus was bought by IBM, the SmartSuite developer has been able to take advantage of the IBM ViaVoice speech engine. The Millennium Edition of SmartSuite made this available for Word Pro – traditional dictation. But with the latest release of Lotus 1-2-3, in SmartSuite Release 9.6, you can enter and format data in your spreadsheet by talking to your PC. This might keep you company in a hotel room but could be chaotic in a crowded office.

The present Millennium Edition added over 50 new @functions and you can have 65,536 rows per worksheet, the same as Excel 2000.

Like Excel 10, Lotus 1-2-3 Release 9.6 also offers web tables letting you bring live, web-based information into a spreadsheet

where you can perform analysis functions. This is a great advance for people who need to work in real time – investors, meteorologists, auction bidders, and so on.

Corel Quattro Pro

The key feature that has always separated Quattro Pro from Excel and Lotus 1-2-3 is that it can handle dates before 1900. There are unofficial shareware add-ons you can use with Excel and 1-2-3 but if your principal use of a spreadsheet is for recording and calculating historical data, Quattro Pro is your best bet. It recognises dates from 1 January 1600 to 31 December 3199.

Quattro Pro owes much to both Lotus 1-2-3 and Excel. In years gone by Quattro Pro was always the slowest functioning spreadsheet, but since it was taken over by Corel it is just as swift as its competitors. Where it leads today is in value for money, not only with a competitive initial price but also the number of templates it offers and volume of clip-art.

The next release of Quattro Pro will be Version 10, available in the suite to be called WordPerfect Office 2002.

Sun StarCalc

StarOffice is currently on Version 5.2 and StarCalc, the spreadsheet module, is equivalent to Excel 97. You can import Excel files from Version 4 through 2000, as well as a variety of recent Lotus 1-2-3 and Corel Quattro Pro file formats, plus databases in dBase or text formats.

Many of the features are the same as in Excel, but with different names. StarCalc AutoComplete displays a similar dialog box to that which can be automatically available when you select a function in Excel.

The charting features are not as extensive and there are no mapping facilities. This is because mapping is provided by an add-in with Excel. StarCalc allows for add-ins, if they are available.

Databases

If you want to store, manipulate and retrieve structured data, you need a database. The four products here do the same job - but how they do it varies significantly

All self-respecting 'office' suites have a database package lurking somewhere within one of their versions. Sun StarOffice has StarOffice Base, Corel WordPerfect Office has Paradox. Lotus SmartSuite integrates Approach, and Microsoft Office Professional has perhaps the best known of them all - Access. Here are four packages that do essentially the same job (allow you to store, manipulate and retrieve structured data) but differ significantly in implementation.

Sun StarOffice Base

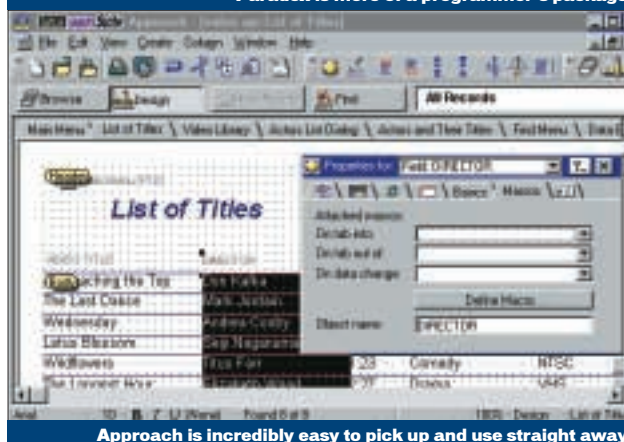
StarOffice is the new kid on the block and it differs from the others in that it is offered for Linux and also, temptingly, for free. The most recent version of StarOffice Base (5.2) uses the Adabas D database engine, which replaces the Oterro database engine previously used (databases based on the Oterro engine format can easily be converted to Adabas). StarOffice is a brave attempt by Sun, but StarOffice Base has yet to win significant market share, so you will be out on a limb if you choose to use it.

Corel Paradox

Paradox, on the other hand, has been around since the days of DOS so you will be in good company if you elect to use this. Having said that, the product has



Paradox is more of a programmer's package



Approach is incredibly easy to pick up and use straight away

been through some tough times; on occasions changing ownership so frequently that it was hard to keep track. This seems to have settled down now and finally emerged as one of the stronger packages here.

Paradox comes from a time when only developers created databases and so it still leans more towards the programmer than the end user. While a novice can use Paradox to create and manipulate an address list, the real strength of the package lies in the way programmers can, for example, use the jPdox Web Utilities (supplied) - Java-based tools that allow the creation of database-driven websites.

Also supplied with the product are Paradox Web Form Designer and MERANT DataDirect ODBC Paradox 9 Driver which supports data sharing with other ODBC-compliant databases.

Lotus Approach

Just like Paradox, Approach has a chequered history and it also remains faithful to its intended audience. Where it differs significantly from Paradox, though, is that the original audience was never developers but end users. So, even today, Approach is incredibly easy to pick up and start using.

For example, databases typically store data in tables but let you look at it using forms - so most database programs insist that you first create a table and then design the form. Approach lets you design the form immediately and it will create the necessary table for you automatically in the background. This sounds wonderful for the end user, and it is; however there is a downside. Using a product like Approach to create a complex database can be problematic because the apparently tedious

rigour that some products insist on applying to database design is actually used to protect the data stored in the database.

However, Lotus is now stressing Approach's use as a front end to more complex databases held in products such as DB2, Oracle and Lotus Notes. Since these products take over responsibility for the integrity of the data, Approach is also excellent for this task. So, paradoxically, think of Approach either for simple databases or as a front end to complex ones.

Microsoft Access

Microsoft Office is the dominant package by far in terms of sales so it is comforting to know that Access is also by far the best of these databases in terms of adherence to the relational model. This is important because, as suggested above, it is this model that helps to ensure data is held securely and in a way that tends to maintain its integrity.

By dint of some extremely sophisticated design work, Access is also relatively easy to use - not as easy as Approach, but easier than Paradox. Furthermore, as databases become more sophisticated, there is a need to migrate from PC-based databases to client-server systems like DB2, Oracle and SQL Server. Microsoft is in the enviable position of owning both the market-leading PC system (Access) and one of the three pretenders for the client-server crown. It has exploited this to the full by making it very easy to move databases from Access to SQL Server; in addition, Access, just like Approach, can serve as an excellent front end to any client-server database.

It is a sad fact that marketing frequently triumphs over technology and that the package with the highest volume of sales is often not the best. In this case, however, that is not true; Microsoft Office far outsells its rivals and Access is the best all-rounder of the packages here.

Access is by far the best of these databases in terms of adherence to the relational model

Presentation graphics

There is no reason for your presentations to be slapdash or boring with these packages to hand - it's time to start creating

There can be few business people who haven't sat through a long and boring lecture on something relevant to their work. The frustration of an audience viewing yet another hand-written overhead projector slide can be palpable. The fidgeting, scratching, staring into space and praying for a mobile phone call all indicate someone who needs help - the presenter.

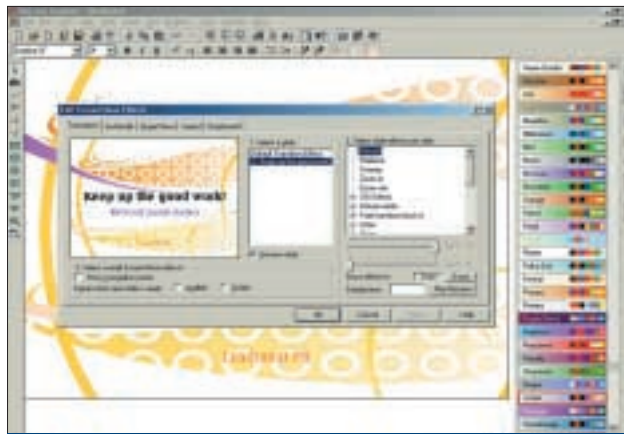
It needn't be like that. With the sophistication of presentation graphics programs and the ease with which you can put together an entertaining and informative show, dull lectures should be outlawed. Anyone, whatever their performance skills, should be able to design and run a lively and involving presentation using any of the major presentation graphics apps on the market.

The big three in presentation graphics are Microsoft's PowerPoint, Freelance from Lotus and Corel's WordPerfect Presentations. Others, such as Harvard Graphics, offer similar features for those on tight budgets. So are there differences and which program should you choose?

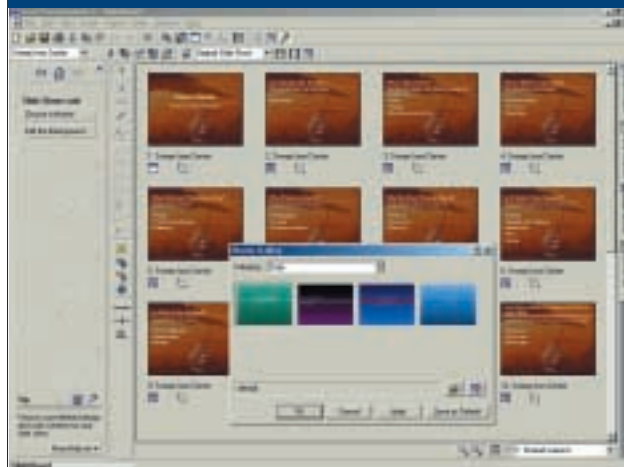
Lotus Freelance

This is one of the oldest dedicated presentation graphics programs and one of the easiest to use. In the latest version, in SmartSuite Millennium, there are plenty of design and content aids to help you put together an exciting presentation.

As well as colour and style wizards, which enable you to pick a suitable design for your presentation slides and a set of co-ordinating colours, Freelance also suggests the subjects your slides should cover. So, for instance, if your presentation is for launching a new product, Freelance suggests you include slides on likely customers, the competition and your suppliers, in case you'd forgotten to mention any of them. This is a very good memory aid for ensuring you cover all the bases when giving your talk.



Harvard Graphics is about half the price of PowerPoint



Corel Presentations' major strength is its drawing tools

There's also a wizard to help convert Freelance slides to web pages and a plug-in for common Internet browsers to enable playback of Freelance slide-shows. Compatibility with PowerPoint presentations is provided and you can open PowerPoint files transparently, without a separate file-conversion step. The full version of SmartSuite includes a copy of the book, *SmartSuite for Dummies*, which acts as a manual.

Corel Presentations

Corel Presentations, the presentation graphics module of WordPerfect Office 2000, can also import from and export to PowerPoint, but only as separate files. It does mean you can play back a Corel Presentation on Microsoft's application, though.

The major strength of the Corel product is the drawing

tools it has inherited from Corel's flagships CorelDraw and PhotoPaint. With these tools you can modify vector and bitmap shapes before incorporating them into your slides. The vector image toolbox includes freehand and line-drawing tools, with several types of editable curves. Cleverly, Corel uses almost identical tools when you're editing bitmap images too, making them very easy to learn.

Corel also offers its SmartShape technology, which gives you a wide range of standard shapes, like stars and flowchart symbols, complete with extra handles to change, for example, the ratio of head-to-stem size in an arrow.

Microsoft PowerPoint

PowerPoint is catching up on graphic versatility and in its latest version offers very similar editing

tools to Corel Presentations. It has a wide range of predefined shapes, as well as editable straight lines and curves and the innovative three-panel design, which shows a modified slide sorter down the left side of the screen with a flexible pane on the right for styles, colour schemes or transition animations.

The Auto-Content Wizard offers sets of slides for specific purposes although, of course, you can modify these to suit your own requirements. There's a good range of ready-made layout styles, too, so you won't have to start from scratch. Once you've got the slides in order and filled in your text, there's a good range of transitions, which you can apply to complete slides or to individual headlines and bullet points.

PowerPoint is probably the easiest of all presentation graphics programs to use. It can be just a question of filling in the text, but you can also customise slides to your requirements.

Harvard Graphics

For around half the price of PowerPoint, the new version of Harvard Graphics Advanced Presentations, from Serif SPC, can do many of the things the other heavyweight programs can. It has a similar range of slide transitions, special effects and colour schemes to the others and a particularly easy way of accessing many of these through a series of palettes attached to the right-hand side of the screen in what is known as the Studio Bar.

It also includes some extras, such as 'virtual world' transitions, which pass you along corridors or through space before reaching the next part of the presentation. It's almost a disappointment to arrive at each new slide. These animated sequences can be further augmented by Microsoft Agents, little characters like the Wizard from Windows Me that you can customise to speak your own typed text.

Downloading is the name of the game

The days of buying office suites on disc could be numbered as Microsoft and Sun promote the idea of Internet subscriptions

Looking at the new versions of integrated suites, it's increasingly obvious that the extra functions left to be added to these monolithic programs are few and less groundbreaking. Changes are more and more based on ease of use and cosmetic issues, with less of true substance being introduced.

While ease of use and learning are always important features, the basic integrated suite comprising word processor, spreadsheet, database, graphics and organiser is soon going to reach an innovative brick wall.

The key suppliers of these products are aware of this and Microsoft in particular is looking to other ways of providing the same functionality in different ways (and usually at reduced cost to itself). One key thrust is Microsoft's .Net initiative.

This is designed to 'improve your Internet experience' by providing Internet programmers and web masters with tools to link sites more effectively. It will enable, for example, Internet tools to search a number of sites for competitive quotes on goods or services, without you having to check each offering individually.

The .Net concept is also about offering future versions of Windows on yet further designs and sizes of information appliance. This will, according to Microsoft, offer people more control and privacy – privacy controls are, apparently, a key part of .Net. Microsoft's stated aim is for better integration of services, but it will also, coincidentally, enable it to sell products in different ways.

Microsoft Office, from version 10 on, will be available on subscription. You will still be able to buy a full retail package or have one bundled with a new PC, but alternatively, you'll be able to buy the product on subscription, year-on-year. The initial cost of the program in this form will be lower and you'll be able to renew

your subscription at Microsoft's website by offering your credit card details – how handy.

As well as being a new revenue source for Microsoft, it will probably enable some PC suppliers, for whom Office has traditionally been too expensive to bundle, to include a year's subscription version with their new systems. Microsoft makes it clear that subscription versions of Office will still be able to load, view and print documents after the subscription has run out.

Subscription sale of Office is only one step away from running the program remotely from an Internet server, so it's never actually installed on your own PC or appliance. This is another idea that's in the pipeline from both Microsoft and Sun.

Sun, a traditional rival to Microsoft, is trying a new face on an old tack, to take some of this new net-based business away from its massive competitor. Sun has been trying to persuade us for years to put our PCs aside and rely more on the Internet. First it was the Net PC, much like a thin network terminal, which relied on an intranet server to provide the computing power needed to run office applications. That never caught on, though today's Internet PCs are a similar concept and are enjoying some success.

Sun, however, is at it again with StarPortal (www.sun.com/products/staroffice/starportal/). The idea is that you run your office suite from whatever you have handy with which to access the Internet. It might be a PDA, a Pocket PC, a notebook or a desktop machine. Whatever the device, you'd be running your office software from Sun's portal, ie across the Internet.

Now if that sounds slow and laborious, it'll be because you're a 56K modem user. The concept depends on fast, broadband access, with an ISDN connection as a probable minimum. This could present a problem for the



Sun's latest idea for making better use of StarOffice is to let you run it from the Internet on your PDA or Pocket machine



Microsoft's .Net initiative includes the concept of selling applications, such as Office, by annual subscription

truly portable link, where wireless ISDN and ADSL connections are still some way off.

Sun stresses the security of the new model, as all data can be held centrally on a company's secure server. It's hard to see how this is more secure than a machine that isn't passing data across a public phone system, though. Assuming you don't leave your portable device on a train or on the back seat of your car, there's no possibility of data interception though, as your app and its data aren't travelling anywhere.

You can see, though, how a concept like this would hurt Microsoft. If Sun offers StarPortal free, as StarOffice is, and you could run it on a variety of handheld devices from most places in the world, you might

find it useful to download the bits you want as you need them.

There's no doubt moves like this will continue, as the benefits still seem to be largely for the service providers, who will gain increased control over their products and the people who use them. However, the person plugging into the new online subscription software concept does gain some convenience in being able to run software not directly available on their portable appliances.

The future of the integrated suite will not be in changes to its word processor document format or spreadsheet function list, but in the way the program itself is delivered to you. Whether the changes will be greeted with open arms is another question.

Office suites terminology

If you've ever been stumped by some of the terms you come across this month's pcw expert Glossary can help

Add-in: A portion of software that is used in addition to a main program in order to perform specific actions.

ANSI: American National Standards Institute. A character set that is a standardised extension to the ASCII character set.

Applet: A small program that may be part of an OS or application, or written in Java and run in an Internet browser.

ASCII: American Standard Code for Information Interchange. A standardised number code for letters, digits and other characters that can be read by any word processor, text editor or DTP program.

AutoCorrect: An action in Microsoft Word that corrects misspellings of words as they are being typed.

AutoFilter: An action in Microsoft Excel in which the user can reveal specific items in a table by clicking on a particular item.

AutoFormat: An action in Word and Excel that formats data or text according to the way it has been typed or entered, as in a spreadsheet.

AutoText: An action in Word that enters text automatically after a letter and F3 are pressed, with reference to the key letter or word that is kept in a table.

Bitmap: The simplest representation of a graphics image – it uses bits, or pixels, to describe each unit of the image.

Bookmark: A code, or marker, that can be placed in word-processed text to permit cross-referencing, though usually referred to as a marker for a favourite web page.

Cell: A box in a spreadsheet that contains a value, formula or text. These are located by lettered columns and numbered rows.

Clip-art: A file of drawings, or pictures that can quickly and easily be used and altered in graphics and DTP programs.

Clipboard: A portion of memory used to store data that has been cut/copied from an Office app.

Database: A collection of organised information that can easily be altered and rearranged for personal use.

Desktop: The customisable background appearance of the screen when a Windows program is running.

Dialog box: A small box that appears on screen with a text message that requires a response, such as clicking the 'OK' button.

DTP: Desktop publishing – the production of books, newspapers, leaflets, etc, often combining text with graphics.

Field: A space in a word processing document, or a unit

produce different data.

Grammar check: An action in a word processor that allows the user to perform a check for grammatical syntax.

Hyperlink: A link, usually emphasised by underlined blue text that points to another spot in the same or another document, usually used on the web.

Intranet: A network that looks like and operates in a similar way to the Internet, but is confined to an organisation and can be accessed while offline.

Java: Created by Sun Microsystems, this is a

database so that it can be used by another database.

OLE: Object Linking and Embedding. A way of saving an embedded object in a document as code so the document size is not substantially increased.

Plug-in: A software extension to an application, usually in the form of a file of data.

Shareware: Inexpensive programs available on the basis that the author will be paid if the user finds the program useful.

Slide: A page used in PowerPoint, usually as part of a set that comprises a slide show.

Spell check: A program used in a word processor that compares words in text to the words in the dictionary on disk.

Spreadsheet: A table of cells arranged in rows and columns. The values in each cell may have a predefined relationship to the values in other cells.

Template: Standard document or form that can be re-used for various purposes.

Toolbar: A strip of icons used to activate commands or programs.

Unicode: An extended form of ASCII, a 16bit code for alphabetical characters that covers all major world languages.

VBA: Visual Basic for Applications. A scripting language common to, among others, all programs within Microsoft Office.

Vector: Graphics system in which lines and points are defined by co-ordinates, allowing them to be easily scaled.

Wizard: A utility within a program that helps the user perform a task by leading them through specific commands.

WYSIWYG: (what you see is what you get) a term used to describe the way in which some packages represent on screen exactly what you will see when a document is printed.

XML: Extensible Markup Language. A web-authoring language that allows designers to create their own customised tags.



of record in a database, where information can be inserted.

Folder: An object in graphical user interfaces that can store multiple documents, used to organise information.

Formula: A method that defines how one cell in a spreadsheet relates to other cells in the expression of a quantity.

Frame: A container for text or an image, this is a box drawn in a DTP or word processing program, but is not necessarily printed unless it has a defined border style.

Function: An action in a spreadsheet program that is performed on specific data to

programming language for creating applets.

Macro: A series of commands, or actions carried out by using a symbol, key or name.

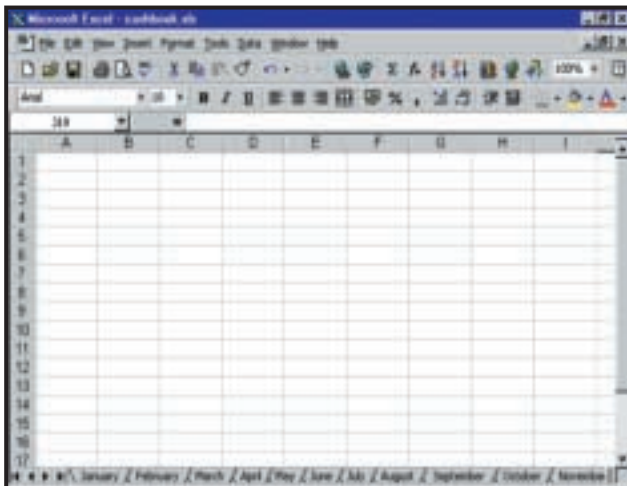
Mailmerge: A word processing action in which the software combines a list of data with a standard document, such as a form letter, to produce multiple copies of the letter with different information, such as addresses.

Mapping: The translation of data by using a specific location, or an equation, which would be the location address.

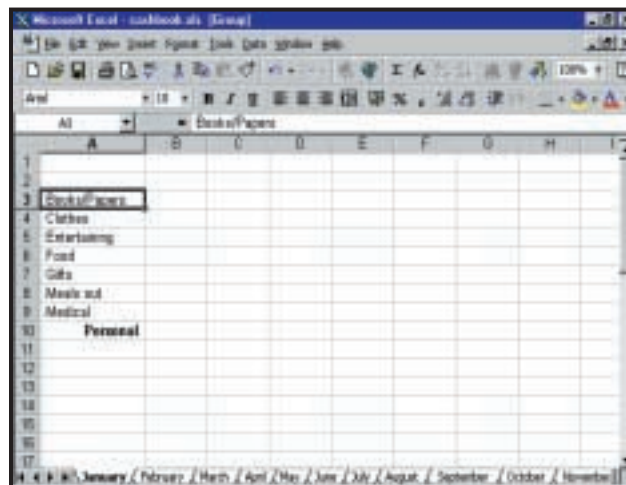
ODBC: Open Database Connectivity. A set of routines that formats data from a

Creating personal accounts on a spreadsheet

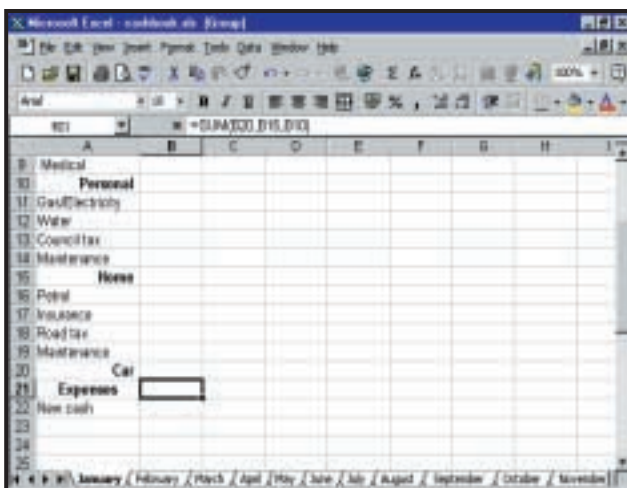
Keeping track of your income and expenses is easy if you follow the step-by-step guide below



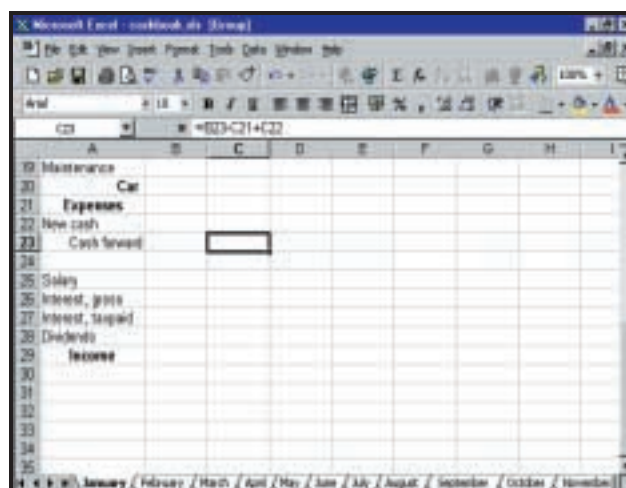
1 For this example you'll need 14 worksheets in your workbook. Excel is used here but other spreadsheets work in similar ways. On the Tools menu choose Options, General and under sheets in workbook enter 14. Then open a new workbook. Alternatively, if you already have, say, seven sheets you can group them by holding down Shift and clicking the first and last one, right-click, choose Copy and then check the Create a Copy box. Right-click on each tab consecutively and rename them January through December, Total, and Bank.



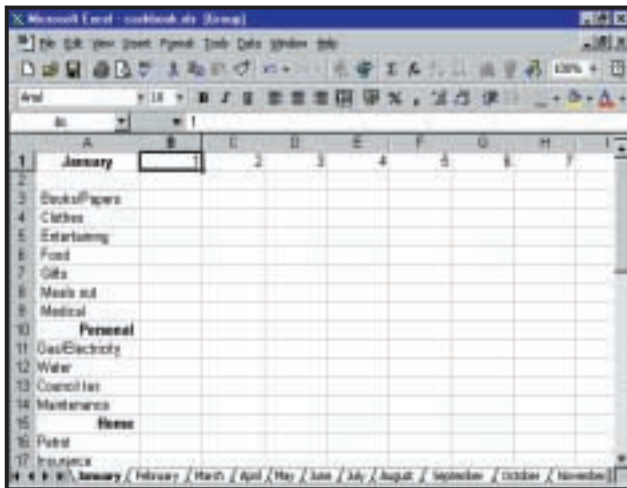
2 It is up to you to specify the categories of expenses that reflect your life. You may rent and not own a home. You may have an annual train season ticket, or run a car. The main thing in this step is to decide on the 'account names' or expense items you regularly have, and split them under subtotals. Group the 13 sheets, January through Total, (so you are working on all these sheets at once) and enter these items in column A, starting in cell A3.



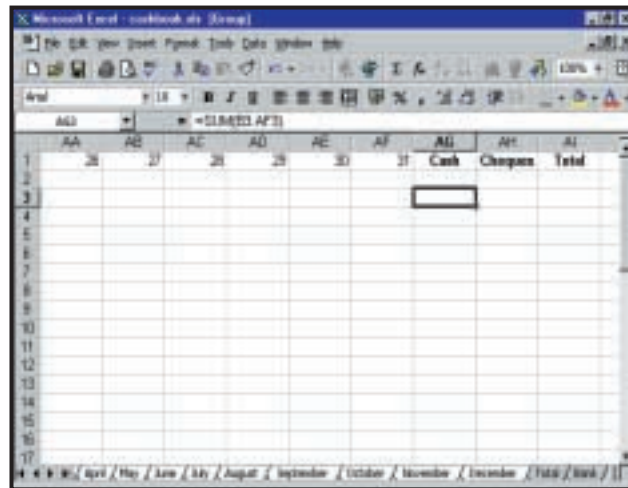
5 In column A you can enter a subtotalling formula such as =SUBTOTAL(9,B3:B9). The 9 is a function number meaning, SUM. (Using a 1 would give the average of the range.) Don't leave any blank rows then click the cell under the last subtotal and the AutoSum tool. Excel will total the subtotals only, and display in the formula bar something like =SUM(B20,B15,B10). The last item is New cash. When you put fresh cash in your pocket (typically from a bank's hole-in-the-wall) you enter the amount here.



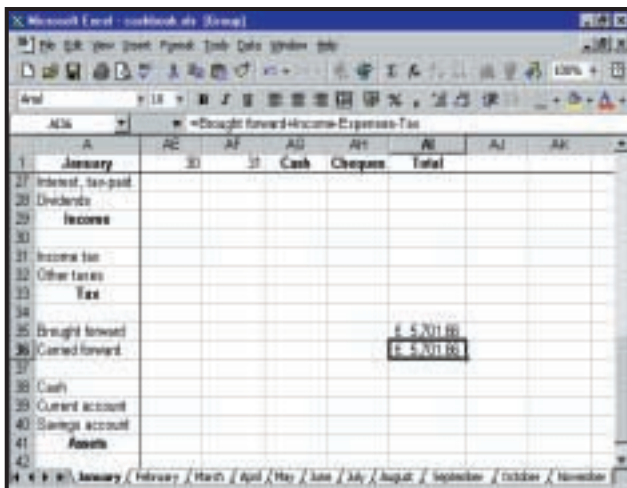
6 The Cash forward formula in column C is =B23-C21+C22 which is yesterday's ending cash balance plus any new cash, less today's expenses. All these formulae can be dragged across to column AF. This gives you the daily totals of cash outlay and the amount of cash carried forward daily. Leave a blank row and make a similar but shorter section for your various types of income. This might be salary, savings interest, investment income and even winnings. Most of this may well arrive in the Cheques column.



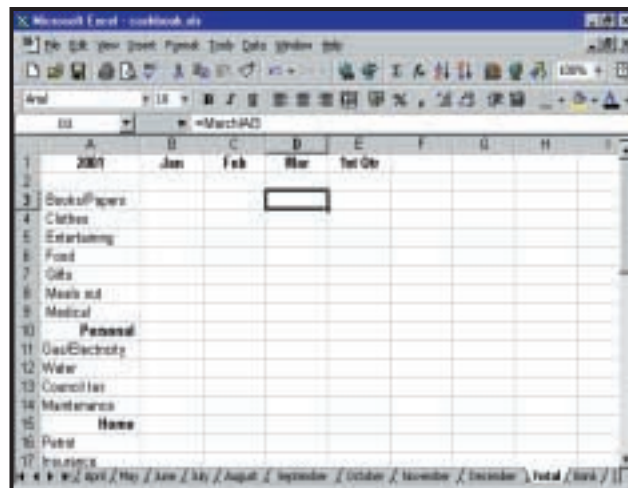
3 The subheads here, Personal, Home, and Car give you the idea. Right-click on a tab and choose Ungroup Sheets. In cell A1 of each sheet enter the same month as on the tab and, on the Total sheet, enter the year, 2001. Now Group just the monthly sheets and enter 1 in B1 and 2 in C1. Highlight those two cells, point to the Fill Handle at the bottom right of C1 and drag across so the columns B1 to AF1 are headed 1 through 31.



4 Cells AG1 to AI1 have the headings, Cash, Cheques, and Total respectively. In cell AG3 enter =SUM(B3:AF3). In AI3 enter =AG3+AH3. Drag these formulae down to include all your expense items. Column AG will total cash outlays for each item and subtotal in the month. Don't worry about the number of days in each month. If there are only 28 or 30 the remaining days are left blank. Cheques written during a month are entered in column AH and included in the totals in column AI.



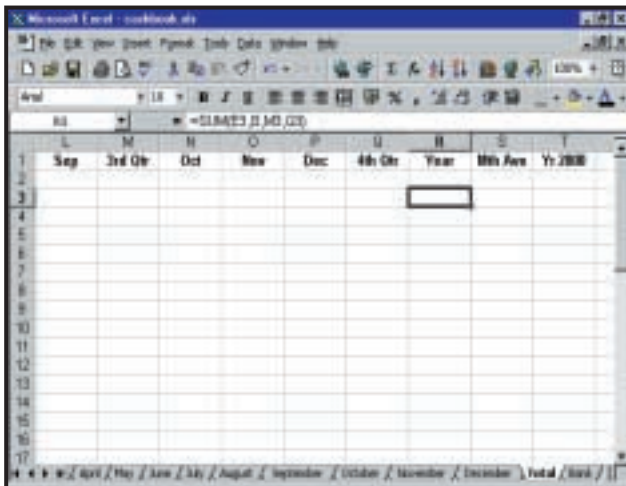
7 Cash assets are cash in hand plus money in current and savings accounts. Click on cell B2, then Window, Freeze panes – so you can see the labels as you move about. In cell AI35 enter the total of your cash assets at the end of last month. Excel will recognise your labels so in cell AI36 you can enter =Brought forward+Income-Expenses-Tax. Bring the current cash forward by entering =AF23 in cell AI38. Enter your current account balance in AI39 and your savings in AI40. Ungroup the sheets.



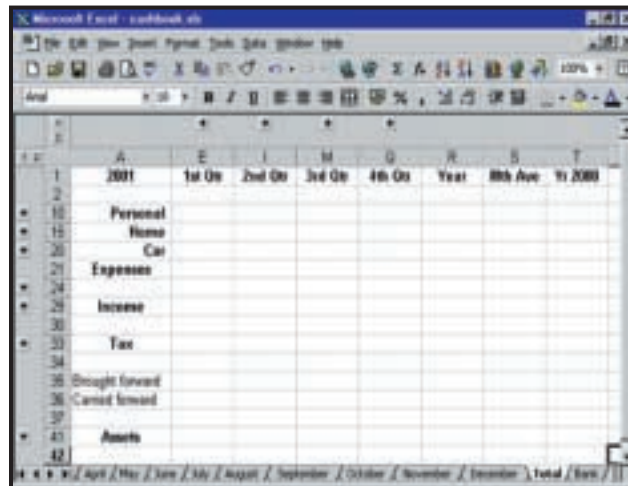
8 At this point, save a copy of the file for safety, then make a few typical daily entries to check that all the monthly totals are working. Now, click on the Total tab and enter the first column headings as shown. Click on cell B3, enter an equals sign (=), then click on cell =January!A13. Drag this formula down the column. Fill in columns C and D the same way. Click on cell E3 and AutoSum and Excel will enter, =SUM(B3:D3). Drag this formula down, too.

Continued overleaf

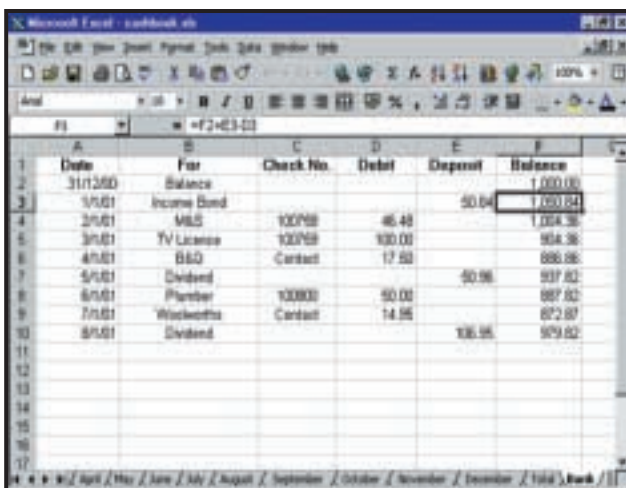
Personal accounts on a spreadsheet (continued)



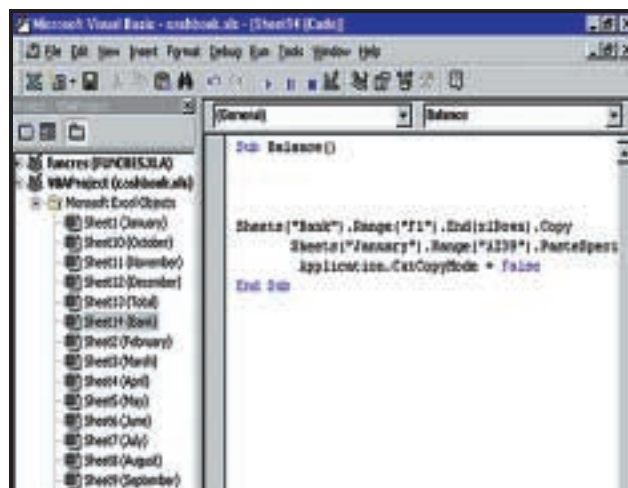
9 To remove zeroes, choose Tools, Options and clear the Zero values box. Complete the remaining quarterly totals then in cell R3 enter =SUM(E3,I3,M3,Q3). Drag down to produce an annual total for each Expenses, Income, and Tax item. You can optionally calculate the percentage of the total spent in each category; or link to a previous year's totals for a year-to-year comparison. Just remember that asset items are not totalled. The cash balance at the end of the year is the same as at the end of December.



10 You can outline the Totals sheet to display summaries or details, - monthly, quarterly and annually. Highlight column headings B through D and choose Data, Group and Outline, Group. Then click the hyphen. Repeat for the second, third, and fourth quarters. Do the same with row numbers 3 through 9. Repeat for each succeeding group. To see the monthly results in the first quarter you can just click the + sign above 1st Qtr. To display the details of home expenses just click the + sign beside Home.



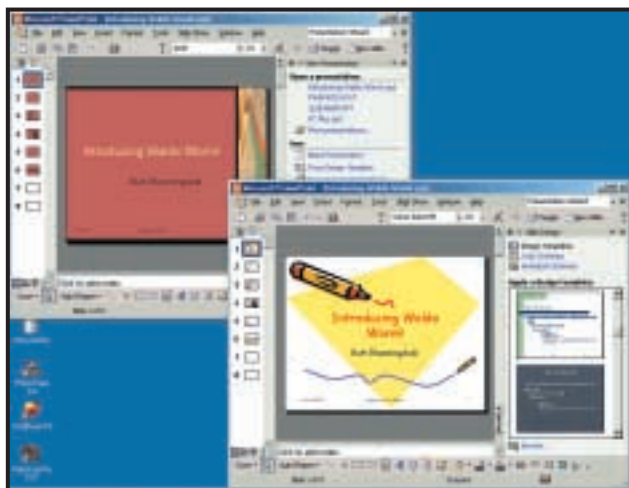
11 Lay out the bank worksheet as above. The formula in cell F2 is =F2+E3-D3, which adds a deposit or deducts a debit from the running balance. Press Alt & F11, click the View Code button and enter:
 Sub Balance()
 Sheets("Bank").Range("F1").End(xlDown).Copy
 Sheets("January").Range("A139")
 .PasteSpecial Paste:=xlValues Application.
 CutCopyMode = False
 End Sub
 (Key: code string continues)



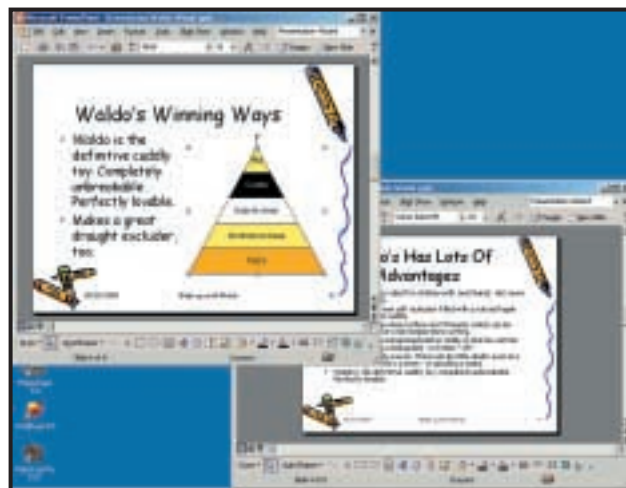
12 This simple macro transfers the current bank balance into your monthly calculations. Obviously your bank balance will change monthly, so at the end of each month you can swiftly edit the macro and change the month, January to February, and so on. In the illustrated example the macro will enter 979.82 into cell A139 on the January worksheet. If you choose Tools, Macro, Options, and enter a B, you can run the macro using Ctrl & Shift & B. Save the completed blank file and try it out on a copy.

Tips for effective presentations

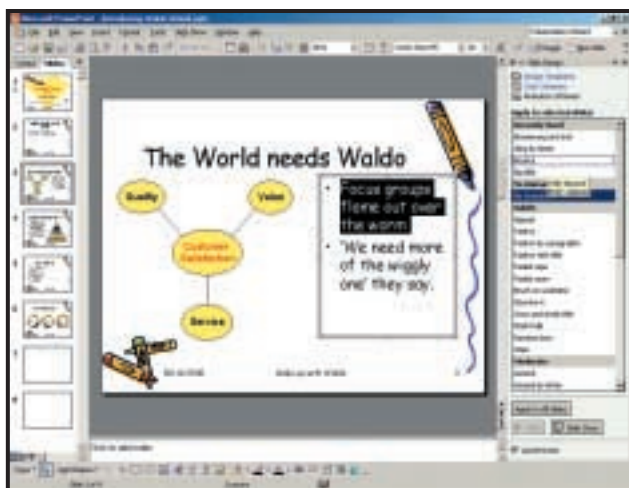
Here is some simple advice to help you produce graphics and slide shows that will hold your audience's attention



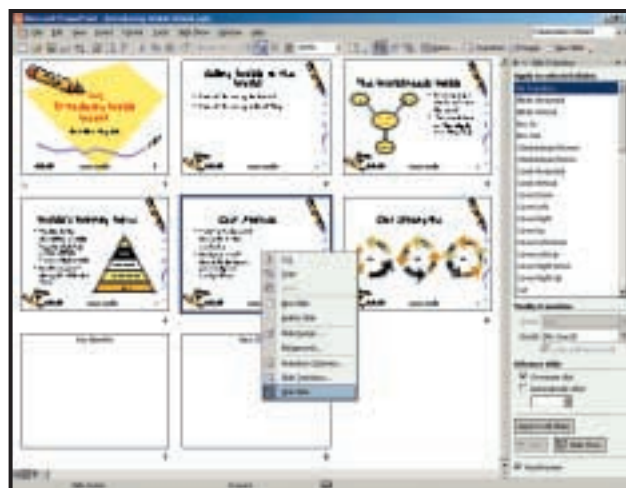
1 Make the slide design support your subject (putting important things in the bottom right is more effective than the top left). The predefined designs, colour schemes and content wizards make creating a presentation easy. However, you still need to pay attention to what you're trying to say and how that works with your slides. If you're not shackled by having to use a house style, select a layout and colour that suits your subject. Don't use a flowery background if you're after dynamism. Don't use technical images if you're selling a timeshare.



2 Break the presentation into bite-sized pieces. Don't put too much on each slide. Try and limit yourself to a couple of paragraphs or three bullet points on any slide. If you show more, your audience will be too busy reading to listen to you. The same goes for diagrams – keep them simple. Combine small pie segments so you only have four or five in any pie chart. Limit graphs to three or four lines and try and make the meaning of each line obvious, ideally without using legends.



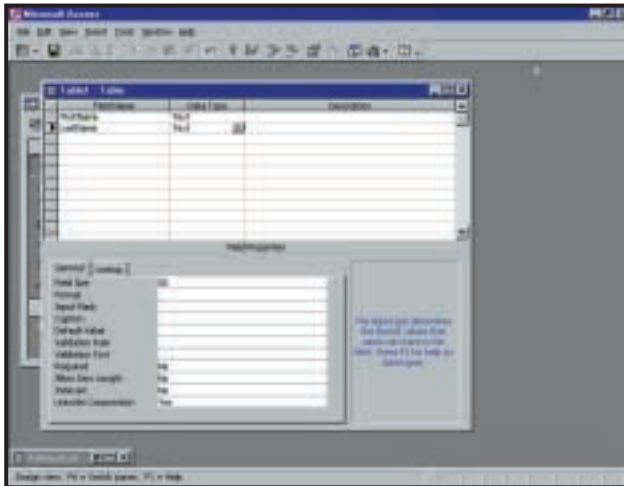
3 Be consistent. It should be obvious that you don't use a variety of fonts on a slide. With the amount of text on each one, you shouldn't need more than one typeface. This consistency should carry through to the transitions in your slide show, too. Animated transitions add movement to your presentation and act as punctuation between slides. Pick a transition and stick to it throughout your presentation. If you want to use transitions for separate paragraphs or bullet points, that's fine, but again use the same one for each.



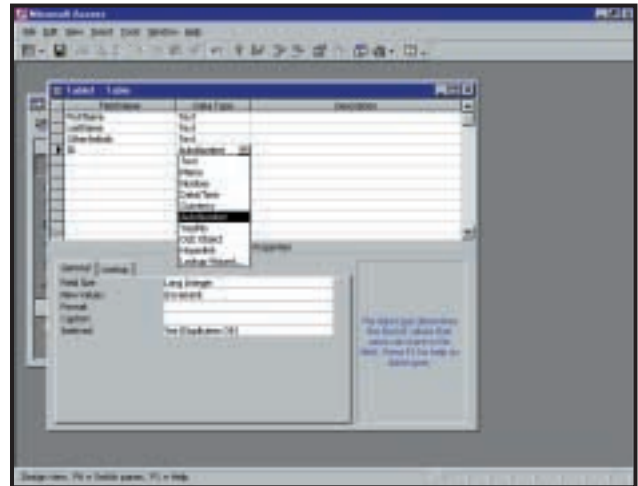
4 Don't pack too much into your presentation. Try and weed out the less important facts in your story and leave them out of the main presentation. By all means make slides for them, but use the option to keep them hidden from the main slide thread. When you've finished your presentation, you can bring in selected optional slides if you have time, or in answer to questions from your audience. It can look very impressive to have slides prepared to answer obvious questions. Finally, spell and grammar check every slide.

Setting up a contacts database

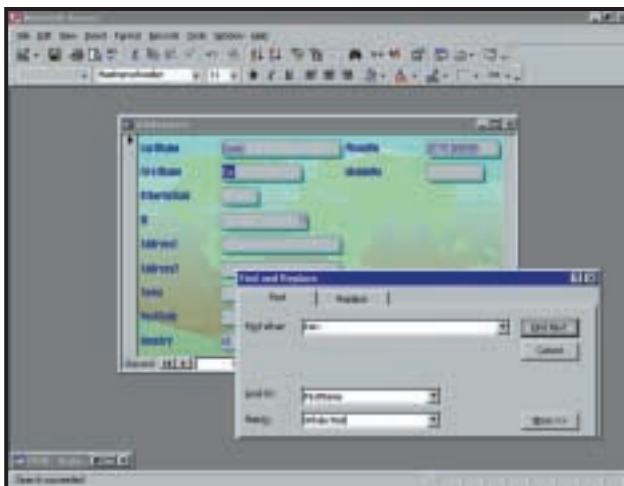
Keeping track of all your friends, family and work colleagues can be a pain, but databases can make things easier



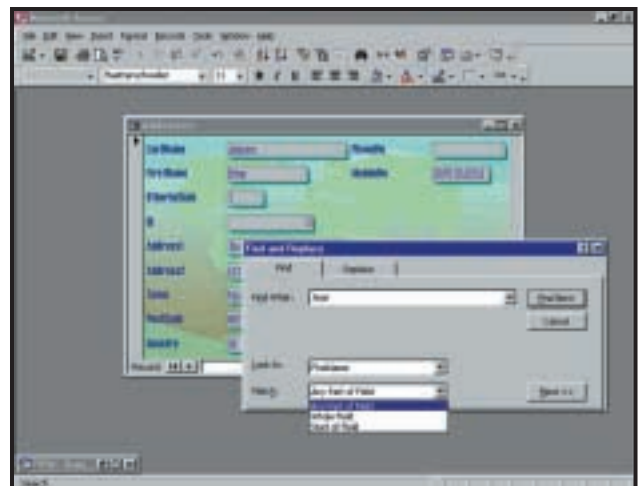
1 Building a database isn't difficult, you simply need to be methodical. The first step is to decide what data you want to store in your database: then you build a table to hold it. A table consists of fields to hold specific pieces of information; for an address list, you'd need one field to hold the first name of a contact, another for last name and so on. Many DBMSs (database management systems) offer a range of pre-built databases and/or lists of popular fields if you don't want to start from scratch, but for this demonstration, we will start from the beginning. The table is being created here in Access' design view.



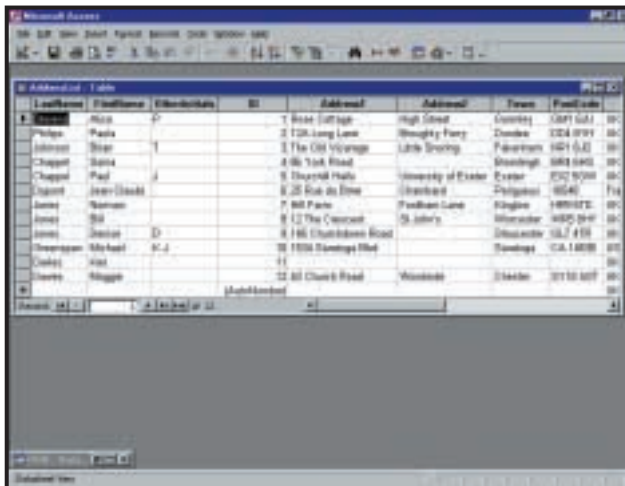
2 Each field has a data type that determines what can be stored in it. Names are text and therefore stored in a Text data type field. Databases typically offer a range of data types as shown here. Most fields in this table are text fields, even phone numbers, because you won't ever need to add or multiply such numbers. You might decide to add an ID field of the AutoNumber data type to make identification easier if you know two Ian Browns – Access automatically puts a unique number into an AutoNumber field when you enter data.



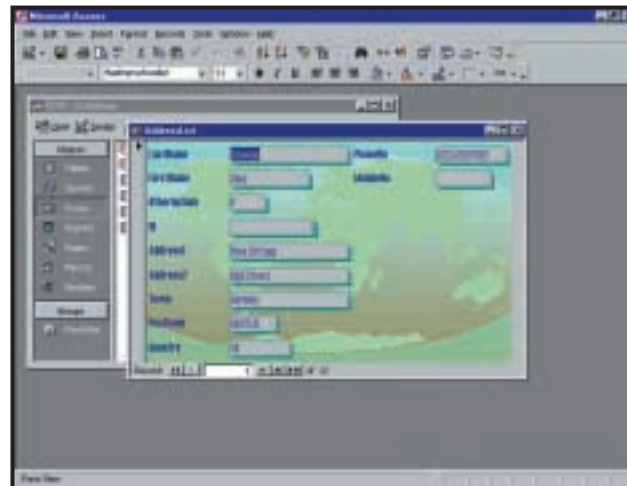
5 Using the navigation buttons at the bottom of the form you can move quickly between records: this works well with a small database. When your database grows, experiment with the Find button on the top menu bar (its icon is a pair of binoculars). If you want to find Ken, click in the FirstName field on the form, click the Find button and in the window that opens, type Ken in the Find What box and click Find Next. Ken's record is then displayed in the form.



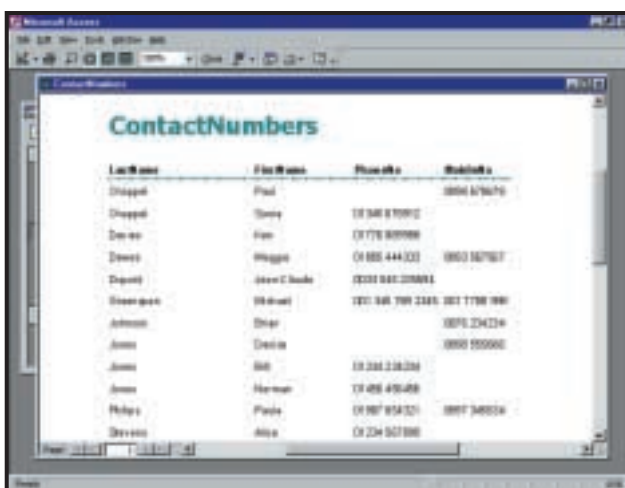
6 If you're looking for someone with a long name (Jean-Claude, for instance), start in the same way but just type in Jean and in the Match box, select Any Part of Field or, in this case as you've typed the beginning of his name, Start of Field. Click Find Next and Jean-Claude's address will be shown. Experiment with the settings in Match and in Look In and you can locate the information you need in seconds.



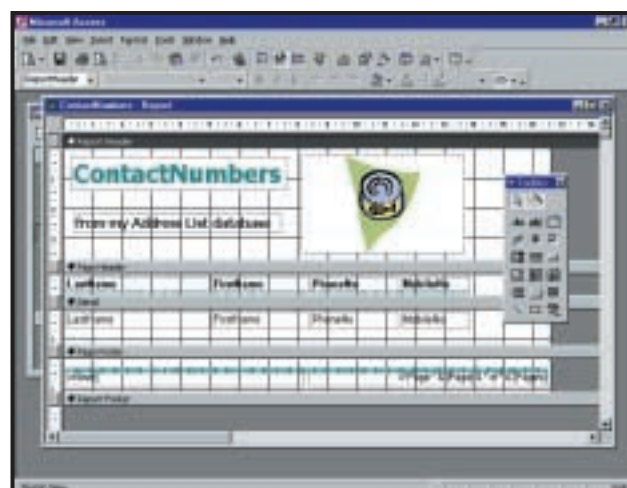
3 Splitting addresses into chunks (and doing the same to names) is well worth the trivial extra effort required when creating the table and entering the data, as it brings huge benefits when you start using the database in earnest to find people. Storing data like this will be beneficial whichever DBMS you choose. This is the completed table with a dozen records entered: a record is made up of all the information you have about one contact. Not all fields are visible in this view.



4 The view of the table shown in step 3 isn't very appealing, however you can improve the looks of your database by using forms, which are customised views of the records in a table. Forms often display one record at a time and don't have to show all fields. If you wanted a form for inspecting just postal addresses, you could design one without the phone/mobile number fields. Many DBMSs have a Wizard or equivalent to walk you through the steps to creating a form. We used Access' Form wizard and the screenshot above is the result using one of 10 predesigned layouts.



7 You can produce printed output from your database by generating a report, for example, if you wanted a printed list of contact numbers. You'll probably find a Wizard or similar to help you through the process of creating a report. We used Access' wizard and first selected the fields we wanted to see in the report. Then we decided that the records should be printed out in alphabetical order of last name. Having chosen a layout style for the report and given it a name, the wizard builds the whole thing and shows it on screen, as you see here.



8 It's now ready to be sent to the printer. Other layouts are available and, if you want to get really clever, you can customise the report in the report design environment where you can determine exactly where fields will appear on the page, experiment with fonts, borders and colours and add graphics. There's also a form design environment for doing the same with forms.



hands on

Arguably computers have played a large part in the perceived speeding up of modern life. So it's particularly ironic when we find ourselves becoming extremely agitated with Windows' slow start-up time. If you suffer this kind of Windows rage then Terence Green has some tips in this month's Windows 2000 column (p238) on getting Microsoft's beast of an operating system to kick into gear faster than Colin McRae's rally car.

For those performance monsters out there, Roger Gann throws caution to the wind and zips up his anorak all the way to get into the nitty gritty of performance tweaking in Windows NT4 (p240).

And have you ever wondered why mobile phones can offer so much power but cost so little? Simon Rockman has the answers in his PDA and Mobile Devices column (p271).

As usual there's plenty more packed into the section including the answers to your questions in Q&A (p226), design tips in Graphics and DTP (p256), and the lowdown on the benefits of fast RAM in Gordon Laing's Hardware column (p246).

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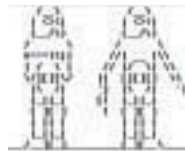
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Advice from our experts

Got a problem? Our Hands On experts answer your questions and solve your problems

Windows

Q I have a list of contacts in a Windows 3.1 Cardfile. How can I transfer these into Outlook Express?

Jerome Cary

A In short, you can't. Even if it were technically possible, Cardfile has just two fields per record, the title and the content. The latter can be anything from addresses to recipes to trainspotting data. What you can do, however, is extract a Cardfile to a text file and then manipulate it with a word processor.

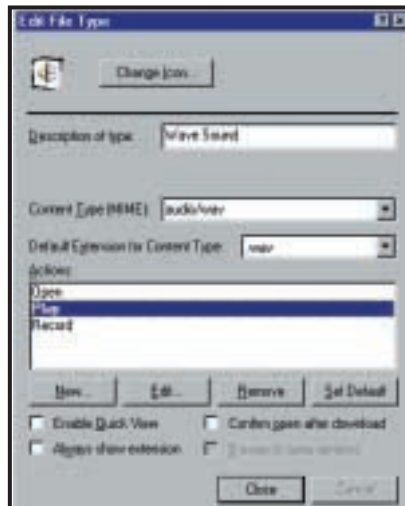
First you need to install another printer. Trust me! Open the Printers folder and double-click 'Add Printer'. Choose Generic/Text Only and, when prompted to choose a port, select FILE:, then answer 'no' to the default and test page questions. You may be asked for the installation CD. Open your Cardfile, then go to File, Print Setup. Choose the 'Generic/Text printer on FILE:' as the printer and 'Continuous - no page breaks' as source. OK out, then go to File, Page Setup and delete the contents of the Header and Footer boxes. OK out, then File, Print All. You'll be prompted for a file name and you should end up with a plain-text file of the entire Cardfile contents.

Incidentally, if you don't have a copy of Cardfile rescued from an old Windows 3.x installation, you can find it on both the Windows 98 CD (win98_40.cab) and the Windows Me CD (win_16.cab).

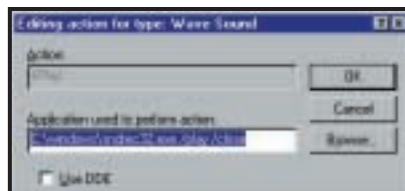
Q I would like to know how to make Sound Recorder open, play and close .wav files on its own. At the moment I use Windows Media Player, which requires me to press Play and Close afterwards. I want to use the normal Sound Recorder for speed, and having it play and close on its own would help.

Daniel Hoult

A Go to Explorer, View, Folder Options, File Types and scroll down to the Wave File. Click Edit. If there's an entry for Play, select it and



Wave retraining step one



Wave retraining step two

again click Edit. If not, click New, then type Play as the name of the new Action. In the 'Application used to perform action' box type the following: C:\Windows\sndrec32.exe /play /close then OK out. Select the Play action, and click the Default button: this makes the action happen when you double-click. Close the dialog, and double-click on a .wav file: it should load in Sound Recorder, play and close. One word of warning: Sound Recorder can take a long time to load big files.

Q Is there any way to remove the arrow mark from the lower left corner of any shortcut icon on the desktop without editing the Registry?

Deepak Shukla, India

A Yes, you can do this with TweakUI in Windows 95, 98 and Me. As mentioned in last month's Hands On Windows, a new version of this is available at www.microsoft.com/

networkstation/downloads/powertoys/networking/nttweakUI.asp.

Q I seem to have a 'Recycled' folder on both my hard disk drives, C: and D:. Is there a way I can just confine this to the Recycle Bin on C:?

Stephanie Morris

A No. The Recycled folders on each drive or partition are where deleted files and folders are stored. The Recycle Bin itself is a control centre for all the Recycled folders: there's no duplication involved. What you can do, however, is change the percentage of space on each drive allowed for recycling.

Windows NT

Q Is there a Scheduler you can use with NT to execute applications? The AT command only runs NT commands and will not run an MS Access application which I would like to automate.

Jimmy Sumar

A The AT service is a very simple scheduler - it will run an NT command or program at the time you specify but that's about it. It's not 'interactive' and so can't control a program once it's been launched.

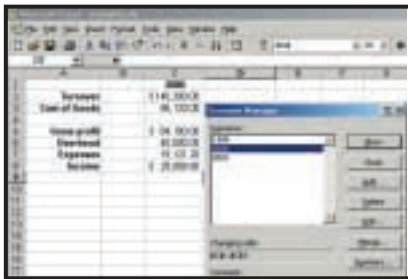
What I think you need is something like Macro Scheduler 6.1 from MJT Net - www.mjtnet.com. This is a very powerful program with a steep learning curve; however, excellent documentation and a well-designed interface make the process as painless as possible. Specify a command string, or create a script, and have Macro Scheduler run it at a certain time on specific days of the week, monthly on a given date, or every 'x' minutes. You can record and edit scripts, and commands are well documented, logical, and easy to understand. A script editor/debugger is available, complete with tree view and drop-down pick list access to a vast array of commands. You can even encrypt scripts, to hide the passwords being sent to applications. It costs just £25 and a trial download is available from the website.

Spreadsheets

Q I'd like to make exactly the same calculations on sets of figures spanning several years. Rather than create various Excel worksheets, is there a way of progressively displaying the results that change?

Anthony Sprung

A Considering how useful it is, it's surprising that Excel's Scenario feature isn't used more often. Set up your worksheet with all the formulae in it. For a simple example, say the figures that vary from year to year are in cells C2 and C3 with a descriptive label in C1. On the Tools menu, choose Scenario. Click the Add button. The Scenario Name can be the same as the label in C1. Enter C1:C3 in the Changing cells box. Click OK. That's it. To view the various Scenarios at any time, choose Tools, Scenarios, click on a Scenario Name and click Show. Click another Name and click Show again.



Excel's Scenario function shows just the cells that change

Q How can I increase the number of files that appear in the recently used files list from four to, say, eight in Excel 7?

Tim Allen

A If you're using Excel 95, which was the marketing name of Excel version 7, you can change it in the Registry. Click Start, Run and Enter, regedit. Then look under HKEY_CURRENT_USER\Software\Microsoft. In Excel 97 and 2000, (versions 8 and 9), go to the Tools menu and choose Options, General. There you can select the number of files to be shown.

Q Since upgrading to Excel 2000, my Standard and Formatting toolbars insist on merging, neither having enough tools.

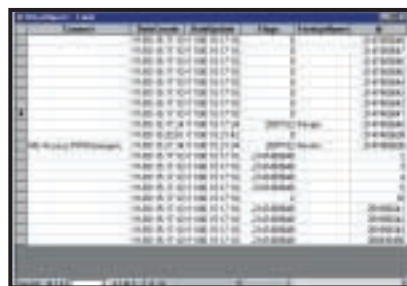
Mrs Wagman

A Go to Customize and then the Options tab, via the Tools menu and uncheck the box against Standard and Formatting toolbars share one row.

Databases

Q I have a password-protected mdb file containing data, and a non-password-protected mdb file containing the interface components. But when I open the interface mdb file I can get to the data without typing in a password! Is this a security hole?

Gavin Thompson



The password is stored in the Connect field

A Yes. You have to type in the password when you make the link; thereafter Access remembers it. In fact, if you open the interface mdb and look in MSysObjects, you can see the password, stored in clear text, in the Connect field (see the screenshot above). Of course, if you can see it here, so can any other user of this file. The only reasonable suggestion is to put the same password protection on both files; that way the only people who can see the password are those who already know it.

Hardware

Q I want to distribute some video on CD-ROM in MPEG-4 format. However, the Divx :-) codec (recommended in January Hands On Hardware) gave an error when I tried to play an MPEG-4 file.

Iain Preston

A The 'Divx :-)' codec can sometimes be a little flaky on some systems, but fortunately Microsoft Media Player 7 (from Microsoft's website) can happily play MPEG-4 videos made using codecs from Divx :-) or the Sharp Internet ViewCam.

Q Do you think it would be possible to use two Cyrix MIII processors on an Abit BP6? I know that they are not certified

for dual operation but then neither were Celerons, and they seem to work fine.

David



A Sadly the Cyrix MIII is not certified for dual operation, and we know of no-one who has made a pair work together.

Q I bought a Sony GDM-1961 19in monitor in an auction and have been trying ever since to find how to use the blessed thing with a standard PC.

David K Dickson

A The Sony GDM-1961 is a single-frequency monitor, so must be fed precisely the correct signal. There are well-documented solutions for using such models with modern graphics cards though. Check out www.geocities.com/SiliconValley/Foothills/4467/fixedsync.html.

Q My mouse has died and replacements don't appear to work either. Can I use my LPT port with an adaptor?

Michael Were

A No, you can't use the LPT parallel port for connecting a mouse. Mice typically connect to 9pin serial, PS/2 or USB ports, and it sounds like whichever port you were using has become disabled through a hardware conflict. Check the ports section of your System Control Panel for any yellow exclamation marks indicating trouble. Alternatively, try using a new mouse that connects to one of the alternative ports mentioned above. If you don't have PS/2 or USB on your PC, you should still have the choice of a second conventional serial COM port.

Q Is it advisable to 'click to enable DMA mode' for the Default IDE DMA Mode Control section of the VIA chipset update installation?

Mark Mitchell



A Yes, if your system supports DMA transfers for your hard disk, then you'll enjoy greater performance with this option enabled. See this month's Hardware column for more information on DMA modes and running new hard disks on older systems.

Q I bought a Tyan Tiger 100 dual Slot 1 motherboard, but am finding it difficult obtaining any Slot 1 PIII 600s. Can I use daughterboard raisers with a pair of Socket-370 FC-PGA PIII's instead?

Stephen Radford

A Yes, you can use FC-PGA socketed Pentium IIIs in older Slot 1 motherboards by using Slocket adaptors, which cost around £20 each – remember to choose one that



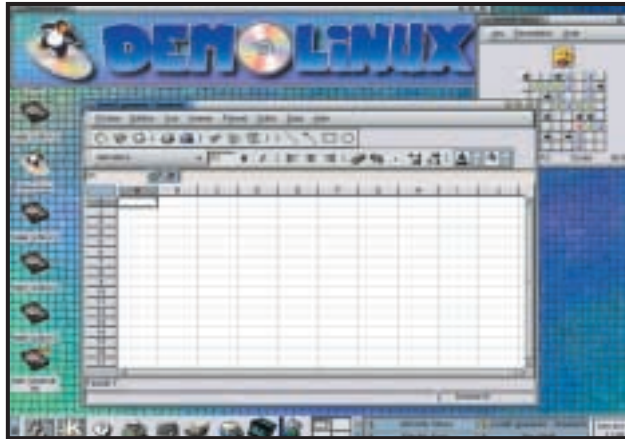
A Slocket adaptor will help you to use Pentium IIIs in older Slot 1 motherboards

is FC-PGA compatible. Note that the Tiger 100 uses a BX chipset, and we've experienced problems running dual FC-PGA processors with such motherboards. US supplier Computernerd (www.computernerd.com) sells MSI slockets that are modified for dual FC-PGA operation on BX boards, and we hope to test them in a future Hardware column. For more information on running dual FC-PGAs on the Tiger 100, check out www.pcaccelerate.com/Inside_Stories/1832-1/1832-1.html.

Unix

Q I've been hearing a lot about the reliability and flexibility of Linux as a replacement for Windows on the desktop. I'd certainly like to give it a try, but at this stage I really don't want to mess around with partitioning my hard disk and risk losing my current setup. Is there a way I can try Linux without risking major damage to my system?

Bernard Nathansen



This is the Gnome Desktop as presented by DemoLinux, a non-invasive demonstration version of Debian Linux put together by a group based at the University of Paris. It runs off the CD, but optionally you can create a Linux filesystem within your existing Windows filesystem without repartitioning, or graduate to a full installation if you create a free partition

A There certainly is, Bernard. The DVD cover disc we produced in the November issue contained the image of the SuSE 7.0 Live Eval CD, which allows you to boot into Linux without changing any of your partitions. If you can't get hold of that, John Winters of the Linux Emporium (www.linuxemporium.com) can sell you the ready-burned CD for a mere £2.50.

And I've just learned of an interesting alternative from France. This is DemoLinux (www.demolinux.org). Unlike the SuSE offering, this is based on the Debian Linux distro and compresses a huge number of Linux applications onto a single CD.

Version 2.0 includes the Gnome and KDE environments, as well as Enlightenment, StarOffice, and a number of games, development tools, and utilities – all in more than a gigabyte of software on a single CD.

There's also a clear path to converting the CD bootable version to a full on-disk installation once you free up a partition. I'm downloading the ISO image even as we speak (25 per cent done, 16 hours to go!), and I hope to tell you more about it in the column next month.

Networks

Q I read your Networks column in the November issue and hoped that you might know the answer to a problem that's driving me up the wall. I have set up a small

two-computer network through a hub; when Windows Me was released I thought that I would set up modem sharing, as only one of the two computers has a modem fitted. Using the wizard was easy, but there's one problem. I can get on the Internet from either PC, but I can only close the connection from the machine that has the modem installed. Is this one of Bill's little jokes? It rather defeats the object of the sharing, as you still have to go to the

machine with the modem. I have tried everything I can think of, but can find no answer. I am sending this from the machine that has no modem and then will have to go downstairs to disconnect from the Internet!

Mike Geary

A I think you're right, but this is the nature of routers – it is demand dialling. All I can suggest is that you set the inactivity time-out to something short, for example one or two minutes, and rely on the other PC to hang up for you, which isn't a brilliant method.

The failure to disconnect is 'by design' and can occur if there is any network activity between the ICS host and the Internet Service Provider (ISP), such as DNS queries or the Critical Update Notification for Windows Update.

ICS defaults to 'Disconnect after five minutes' or to the Internet Explorer 'Disconnect if Idle' setting, depending on which is shorter. To change the Internet Explorer 'Disconnect if Idle' setting, click the Start button, point to Settings, click Control Panel and then double-click Internet. Click the Connection tab and select a connection in the Dial-Up Settings window. Click Settings and in the third section, entitled Dial-Up Settings, of that connection's Settings, click Advanced.

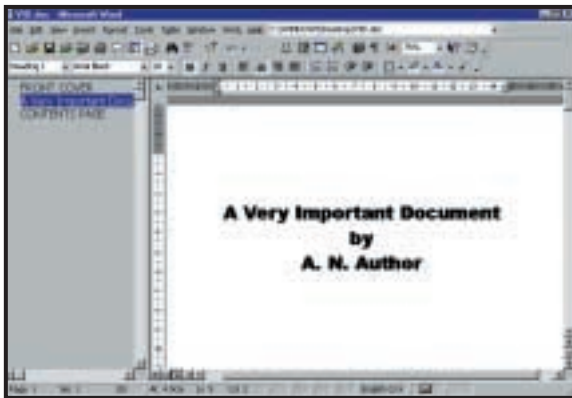
You can see what, if anything, is keeping the line up by checking the contents of the Icslog.txt file. A new log is created every time you reboot and the previous log file is renamed to Icslog.old.

The lcslog.txt file is useful for connections such as ISDN or analog phones that use dial-up networking. For connections such as DSL or cable modems, which use a network adaptor, the contents of the lcslog.txt file show only that the Internet Connection Sharing driver is running.

Word Processing

Q *Is there a way to get text to appear in the Word Document Map, but not in the document? For example, you might want 'Front Cover' to appear in the map, but you don't want the text 'Front Cover' on your first page.*

Matthew Wilson



Hiding text and showing the path

A Good question – formatting the text as 'hidden' also hides it in the map. The only way around this that I can think of is to colour the text white. It will, however, still take up space in the document, so you may want to give it a very small line spacing. Word will let you go down to 0.7 points, which is about 0.25mm. To complete the job you could save this as a style.

Q *I am trying to sort a table in Word. Some of the cells in the column contain a single word. Others contain a keyword – People – followed by a name below, eg Wilson, Scott or Amunsden. These won't sort by the name.*

Dr Bob Turvey

A Word is just sorting by the first paragraph it finds in each cell. If you want it to look at the entire cell contents use a line break (Shift & Enter) instead of a paragraph break (Enter) between the keyword and the name.

Q *How can I see the full path name of a Word document in the title bar?*

Graham Horton

A You can do this with a VBA macro, but for a quick, easy and nearly-what-you-want fix, go to Tools, Customize, Commands, Web and drag 'Address' on to an existing toolbar. Thank you, Trevor Langford, for supplying this solution.

Graphics & DTP

Q *Some time ago I produced a lot of Freehand files that contain high-resolution scanned photos. Now I need to use the photos in other documents, but I can't find them and think I may have deleted them from my hard drive. Is there any way to retrieve the pictures at their original resolution from the Freehand files?*

G Anderson

A It depends. If the scans are embedded in the Freehand document then select edit/links/extract and you can retrieve the original image. If you linked, then the best you can hope for

is a low-resolution preview. Linking rather than embedding imported files keeps the Freehand file size small, but you need the originals to print at high resolution. If you embed high-resolution scans the file size can quickly bloat to unmanageable proportions, especially in multi-page documents. Having the Freehand file as a backup for your high-resolution images isn't an advantage that I'd thought of until now.

Q *I have bought a reconditioned PostScript printer that I am on the whole quite pleased with. Occasionally, though, documents fail to print and I get an error. It usually looks something like %%[Error:limitcheck, though occasionally I have had invalidfont. A friend suggested that I need to install more memory. Is this correct, or is there a fault with the printer?*

M Pilley

A It's likely that the printer is quite old as these errors are more likely to occur in PostScript 1 than later versions. The invalidfont error is probably caused by a corrupted font, re-installing it should solve the problem.

The Limitcheck error occurs when you try to print a complex graphic with long complicated paths, or when a bitmap is just too large, or its resolution too high. You can often overcome this by simplifying paths, breaking them or increasing the flatness setting (which defines how many straight line segments make up a curved path) before you print. Lots of rotated and resized pictures in a page layout application can also cause this problem. Rotate the images and size them correctly in an image editor, before placing them on the page.

Sound

Q *I have a lot of music on vinyl which I want to import into my PC and burn onto CD.*

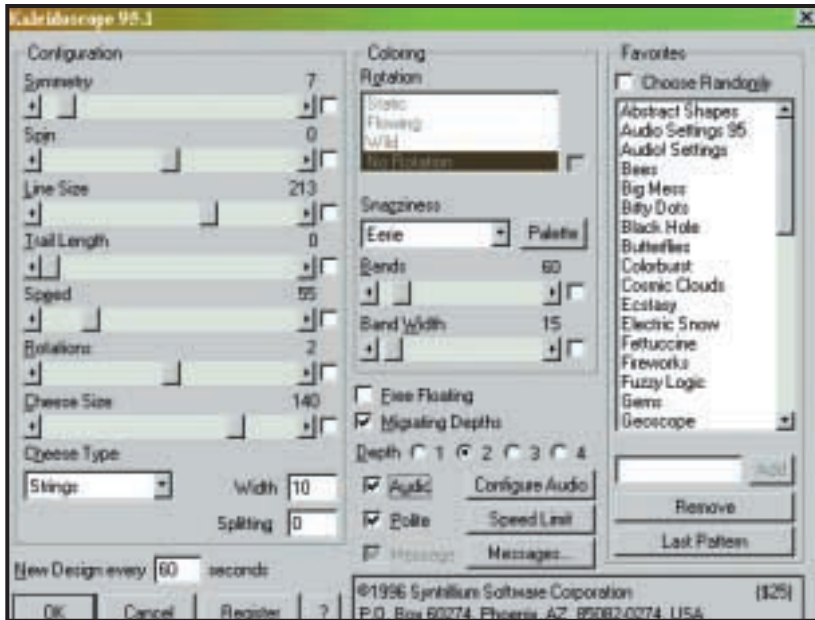
I also have a number of spoken-word audio cassettes that I want to import and convert to MP3 files so that I can listen to them on my Rio MP3 player. Can you recommend the best software?

Tim Marchant

A Easy CD Creator Deluxe Edition includes specific software (called



MusicMatch can convert spoken-word audio cassettes into MP3 files



The Kaleidoscope screensaver can be downloaded from www.syntrillium.com

CD Spin Doctor) for copying music on vinyl or cassette over to CD. It even includes noise reduction algorithms for eliminating clicks and pops from old albums. The software will even split the resultant .wav file into separate tracks if it spots gaps between songs on the original vinyl. In short, it pretty much automates the entire process.

As for converting spoken-word audio cassettes into MP3 files, you're in luck. A piece of software called MusicMatch will do this for you. And even better, it's free! Go to www.musicmatch.com and get a copy. However, make sure you select the right input to record from. To do this go to Options and then Source. You'll need to select either Mic In or Line In.

Q I recently bought a new PC and want to take advantage of its 3D sound capabilities. I have a Creative Live! 1024 sound card wired to Labtec 2514 speakers (four satellite and sub). I am a gamer and would like to experience full 3D sound while playing. Though most games give the option of having 3D sound in their config menus, ticking the box doesn't seem to produce any effect.

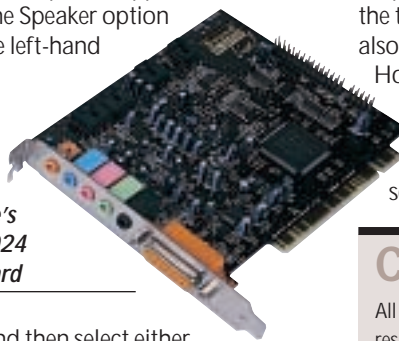
Also, my rear speakers do not seem to be as loud as they should be. They have the same output power as the front ones but even when turned up to full volume, you cannot really hear them. Is there a problem?

Xin Song

A It sounds like your sound card is set up to operate in two-speaker

mode or that the front rear balance control is set incorrectly. To change this to four-speaker or Live! Surround mode click Start, Programs, Creative and Audio HQ. From the Audio HQ menu double-click on the Speaker applet. Select the Speaker option from the left-hand

Creative's Live! 1024 sound card



menu and then select either four-speaker or Live! Surround mode from the drop-down menu according to which mode you want to use. Close the Speaker applet and double-click on the Mixer applet. Select the mixer marked FAD and set it to the middle setting. This is the Front/Rear balance control and should sort out your problem.

Q I have what at first seems to be a really simple question, but one that has been bothering me for some time now. I have my PC connected to my TV and my hi-fi. What I want to do is, when I play a CD on my hi-fi (not on my computer, my hi-fi cost £4,000 and therefore does a much better job!) I want to display the sort of visuals that I get out of RealJukebox on my TV.

I know that is sounds real simple, but I

have no idea on how to get it to work. I can use other programs if necessary, but the visual that I want it to work with is 'Cosmic Belt' or another like it. Any ideas?

Tom Ankrum

A You're right this isn't as easy to achieve as it sounds. What you need is a feed from your stereo system going into the Line-in socket of your sound card. Now, this isn't as easy as it seems, because if you plug a headphone jack into your stereo, your audio is going to stop coming out of your speakers. The amp in your stereo system may have an alternative output that you can use to feed your computer's Line-in socket. If not you're going to have to invest in a mixer that has an Auxiliary send. These types of mixers don't come cheap.

Alternatively, if your sound card has a digital out and your hi-fi has a digital in, you could feed the digital output of your sound card into your expensive hi-fi. This way the sound quality should remain pretty good.

If you do get one of these setups working then go to www.syntrillium.com and grab yourself a copy of Kaleidoscope. This is a screensaver that produces the type of graphics you're after, you can also run it as a standalone program.

However, you have to configure it from the screensaver control panel. To get it to react in time to the music enable the Audio tick box in the screensaver's control panel.

CONTACTS

All of our experts welcome your queries, simply respond to the appropriate address below:

Windows: win@pcw.co.uk

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Windows NT: nt@pcw.co.uk

Unix: unix@pcw.co.uk

Hardware: hardware@pcw.co.uk

Word Processing: wp@pcw.co.uk

Spreadsheets: spreadsheets@pcw.co.uk

Databases: database@pcw.co.uk

Sound: sound@pcw.co.uk

Graphics & DTP: graphics@pcw.co.uk

3D Graphics: 3d@pcw.co.uk

Visual Programming: visual@pcw.co.uk

Web Development: webdev@pcw.co.uk

Ecommerce: ecommerce@pcw.co.uk

PDA and Mobile Devices: pda@pcw.co.uk

Networks: networks@pcw.co.uk

Please do not send unsolicited file attachments.



Safe and sound

Terence Green's cost-free, step-by-step guide to dramatically increase your system's security

A recent MORI survey found that senior business people are 'out of touch with reality' in respect of security threats to their computer networks. No surprise there. But there's no reason for the rest of us to be smug. Most home computers are set up by default to be wide open to nefarious invaders when we visit the Internet. Fortunately, a few simple measures can reduce the risk dramatically.

Some security measures that will reduce the risk are explained below, while our step-by-step workshops explain two critical safety measures for Windows users – installing an antivirus scanner, and tightening up the security of Outlook Express. All operating systems are subject to security threats, but we're picking on Windows and the free Outlook Express email and news reader that comes with it because that's what most people use. Because it's free, and because in its default delivery state it's wide open to malicious attack, the step-by-step guides usefully demonstrate how you can fix some of the more gaping holes with very little effort and no cost.

The key to effective security is to understand the threat before starting to throw technology at it. We tend to think of the Internet as the danger zone and ourselves as the target. To a degree that's true, but the danger zone isn't confined to the Internet. When we unwittingly host a virus that uses our computer to attack others, we are the danger zone too. We think in terms of strangers posing a threat but when we email a cool animated joke we found on the web to a pal, without ever passing it through an antivirus scanner, we are the threat. The important points to remember are that



If we want the Internet to be safer we have to know why it's unsafe so that we can help to fix it

this isn't a blame game. If we want the Internet to be safer we have to know why it's unsafe so that we can help to fix it. We have the technology to minimise the threat we pose to others by unwittingly passing on malicious email and we should be using it. Yes, some jerk somewhere bears responsibility and should be punished for releasing the virus that took over our computer, but we can't do much to affect that. We can, however, do a lot to restrict the speed and extent of the spread.

As delivered on a new computer, or installed as an upgrade, Windows has a set of default options for Internet Explorer and Outlook Express that are focused on ease of use and showing off the flashy side of the Internet. Unfortunately, these choices are the exact opposite of those that are required for security. As delivered, a Windows machine is configured to receive an email and, without any intervention from you,

to distribute viruses to all the contacts in your address book. It's also set up to provide shelter for the electronic equivalent of a Trojan horse and a messaging system with which the Trojan can signal its availability every time you go online. Anyone picking up the signal and knowing what it meant could access your computer and do much as they like with it, even use it to run programs that attack other computers behind your back. Then there are the threats that need a little help.

In recent years email has become endemic. It's a social benefit with a bit of a problem, because it's also the most effective way of distributing viruses, many of which arrive as attachments that, when opened, install viruses or Trojans on our computers. Unfortunately, the standard advice, never open attachments from

strangers, isn't very effective because viruses that use my Outlook Express address book go to my friends and seem to be coming from me. Why wouldn't my friend open what purports to be advice or a joke that I sent? Virus distributors know how we think so they use social engineering like this to get us to do their work. We need to think like virus distributors and, no matter how much fun it is to show the latest pictures of South Park or a faked nude of some celeb to our friends, to be aware that it's a game that provides perfect cover for malicious invaders.

The nude celeb picture and similar scams often sneak in with the help of yet another Windows loophole. In order to make Windows friendly, the display of file extensions is disabled by default. You see files called myletter but its full name is myletter.txt for example. Now, because Windows allows long filenames and because it doesn't reveal the file



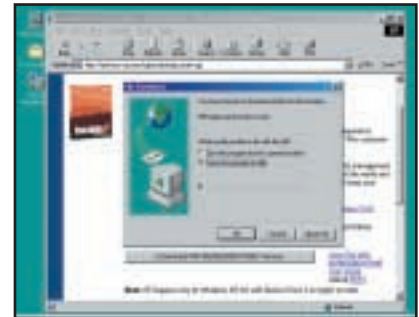
Anti-virus step-by-step



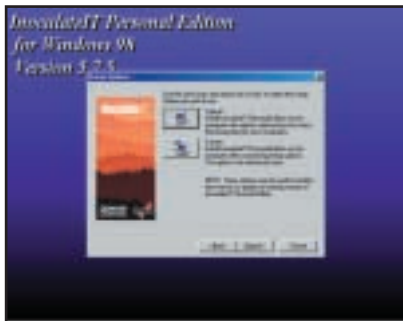
1 InnoculateIT Personal Edition (IPE) is a free anti-virus utility for Windows 95, 98, Me, NT Workstation and 2000. Although given away free by Computer Associates it is a fully functional product. Computer Associates also provides free signature updates to ensure your anti-virus protection is always up to date. An anti-virus scanner that isn't regularly updated in this way is a waste of space. Computer Associates offers daily updates but weekly will do unless there's a new virus scare raging.



2 Click on the 'Download Free Antivirus Software' link to grab a copy of IPE. You have to enter some personal details into a registration form. This appears to be a painless process. I went through the registration process several months ago and have not received any unwanted emails as a result. After submitting these details and confirming them, the licence agreement is displayed. Click on 'Agree' to begin the download process.



3 The download page appears with your unique customer number. Make a note of this as it is required in order to access software upgrades and the free support that Computer Associates offers with IPE. The download consists of a single file, about 3.6MB in size, that supports Windows 95/98/Me/NT/2000. The user guide can also be downloaded as an Adobe Acrobat pdf file.



4 Navigate to the folder where the ipesetup.exe file has been saved and double-click on it to initiate installation. Click Next to move through the opening screens until offered the choice of Typical or Custom install. Select Custom if you want to define where IPE is installed. Otherwise select Typical and click on Next. Installation is quick and painless. Enter the customer number when requested, and click on Next in order to be able to download virus signature updates.



5 Continue clicking through the dialog boxes. Choose to create a reference diskette, then continue until the screen offering to scan local drives appears. Select 'Yes' to scan local disks now and click on Finish to initiate the scan. IPE opens and starts scanning. The opening log entries will show the date of the signature file in use. If it's more than a week old, consider updating the signature files once the scan has completed and you have rebooted.



6 When you're back at the Windows desktop, connect to the Internet if you normally make manual connections. Click on the IPE tray icon and select InnoculateIT PE to open the management window. Click on Tools/AutoDownload to download the most recent update. If asked, enter your registration number and email address. Allow the files to be installed once they have been downloaded. You now have free anti-virus protection.

extension, I can send you a file called funnyjoke.txt.exe and you'll only see funnyjoke.txt. Clearly you're going to open it but it's actually an executable file that can now do anything it has been programmed to do. Normally when you hover the mouse pointer over an attachment, Windows will reveal the full filename in a bubble, but who bothers to

notice the details? Security would be better if we didn't send attachments but that's not realistic. The best protection against incoming baddies is to install and keep regularly updated a good anti-virus scanner, as explained above. But we can also make a small cosmetic change in Windows to show the full filenames of attachments. To do this, open My

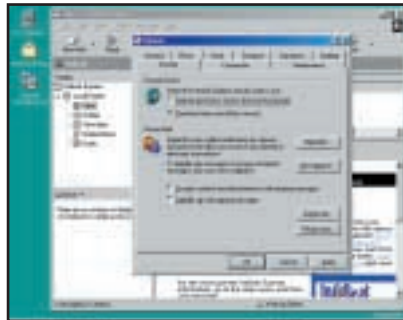
Computer and select Folder Options from the Tools menu. Click on the View tab. Click on the box next to 'Hide file extensions for known file types' to clear it. Click on OK to close Folder Options.

We'll explain some other adjustments to Windows default settings in the Outlook Express step-by-step guide, and these few changes will dramatically

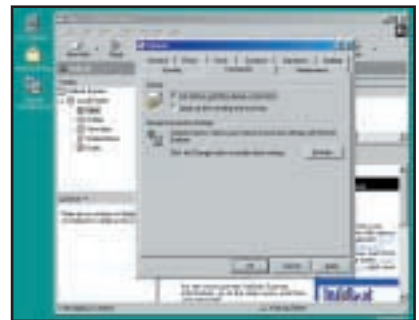
Security zones step-by-step



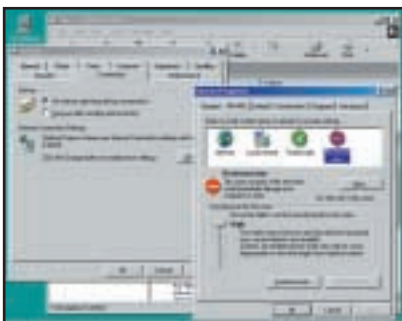
1 HTML email can include code that Outlook Express 4 and 5 will run if the message appears in the Preview window. This means the default state of most Outlook Express setups will automatically run malicious code. The threat level depends on the technical and social skills of the virus author. Outlook Express and Internet Explorer prior to Internet Explorer 5.0 Service Pack 1 have this problem and worse. Upgrade these to Internet Explorer 5 SP1 (IE 5.01) before moving to step two.



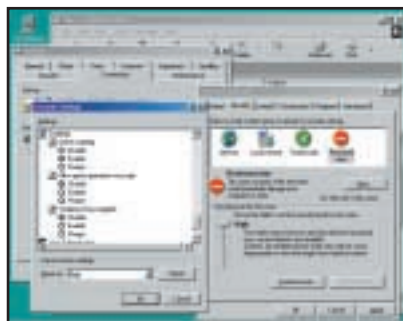
2 To prevent malicious HTML email from activating, first move Outlook Express 5 into the Restricted Zone and then make sure that Active Scripting is disabled. Both steps are necessary. The process is similar for Outlook Express 4 but it is far better to upgrade to IE 5.01. Open Outlook Express, click on Tools, and select Options from the dropdown menu. Click on the Security tab. Under the Security Zones select 'Restricted sites zone (more secure)'.



3 Now ensure that Active Scripting is disabled in the Restricted Zone. Active scripting is disabled by default in new installations of IE5.01 but not in upgrades from IE4. Stay with Options and click on the Connections tab. The message under 'Internet Connection Settings' explains how Outlook Express shares its settings with Internet Explorer. Click on the Change button to check, and if necessary disable, Active Scripting for the Restricted Zone.



4 When the Internet Properties dialog box opens, click on the Security tab and then click on the 'Restricted sites' icon. If the setting under 'Security level for this zone' is Custom and you don't see a slider bar, click on Default Level to display the slider bar and move it to the top position to enable 'High' security. Now we are finally ready to check that Active Scripting is disabled.



5 With the slider bar set at high, click on the Custom Level button to open the Security Settings dialog box. For IE 5.01 or later, setting the Restricted Zone to High disables active scripting. Scroll down towards the bottom of the list to find 'Active Scripting' immediately under the heading 'Scripting'. This option must be disabled in order to lock out malicious HTML emails.



6 Click on 'Disable' under Active Scripting, then click on OK to make the change. Click on Yes to confirm the change when the warning message appears. Click on OK twice to clear the open dialog boxes. Then close Outlook Express and restart it to activate the new security settings that will apply to all emails received through Outlook Express from now on. At regular intervals from now on, use Windows Update to install new critical security updates.

increase the security of your system. Even so, we have only begun to scratch the surface in security terms. Do yourself a favour and use Windows Update (on the Start menu) to download and install the critical security updates that Microsoft makes available.

At the very least you should install all the critical Internet Explorer security

updates, as they close well-known and widely-used loopholes. This is especially important for pre-5 versions of Outlook Express and Internet Explorer, but as you'll see if you dip into the security information that Microsoft provides (definitely worth browsing), there are lots of critical updates for all versions up to the most recent.

CONTACTS

Terence Green welcomes your comments on this month's workshop. You can contact him via the PCW editorial office or email: win2000@pcw.co.uk.

Please do not send unsolicited file attachments.



Hidden talents

Tim Nott uncovers Me's built-in Zip support, tinkers with ANSI code and keeps his favourites safe

Did you know that Windows Me has built-in Zip support? No, nor did I, until Hands On colleague Stephen Wells drew my attention to something called 'Compressed Folders'. The Help files tell you all about these, and how you can 'Create a compressed folder' from a Folder's File, New... menu. The only snag was that neither he nor I could find such a command. After a long trawl through the Control Panel, Add/Remove Programs, Windows Setup, I found 'Compressed Folders' lurking among the System Tools. It doesn't appear to get installed by default, which is probably why I had never heard about it until Stephen mentioned it.

Having installed it lo and behold! there was the menu item. But it gets better. Select a file – or better still a few files – and right-click. From the context menu select Send To, then Compressed Folder. I did this a few times and wondered why nothing happened. I then happened to scroll down to the bottom of the folder and found lots of shiny new Zip files. After a little more experimentation I discovered this: if you send one file to a compressed folder, then the Zip is given the name of the file. If you select several files, then right-click, Send To, Compressed Folder, then the Zip takes the name of the file you right-clicked on. It does this 'silently', ie, there is no further user intervention, which is why I thought nothing was happening.

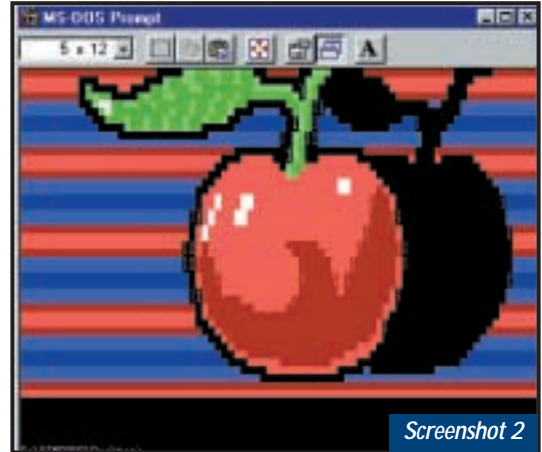
I think that is rather clever, and it suits me very well as most of my Zips consist of a Word rtf file and some screenshots.

Since I usually give the Zip the same name as the document, this is now done automatically, unlike WinZip where I have to type it in. You can add further files to a Zip by dragging them on to it. Double-clicking a Zip file opens it just like any other folder – albeit with more information in the Details view, such as the percentage compression and a CRC-32 checksum (see screenshot 1).

Alternatively, you can right-click and extract the contents to a folder of your choice. You can also password-protect Zips by right-clicking and choosing 'Encrypt'. In short, it's a one-stop solution to all my Zipping needs, and a lot more convenient than either WinZip or ZipMagic. So why didn't Microsoft tell us about it?

Tickle your ANSI

If you look in the Windows\Command folder, you will see a little file called ansi.sys. This little 10KB treasure can transform the dull DOS monochrome screen into a world of sparkling colour with emphasised and underlined text. You can do all sorts of other things with ANSI codes, such as move the cursor around, hide text and even remap the keyboard. The only little snag here is that DOS .sys files have to be loaded with config.sys at boot time. So, under Windows Me, which doesn't support 'real' DOS mode, and hence has no provision for a config.sys, you can't use

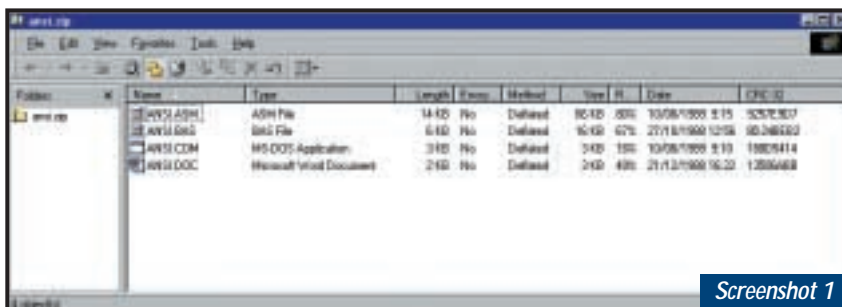


Screenshot 2

Brighten up your DOS sessions

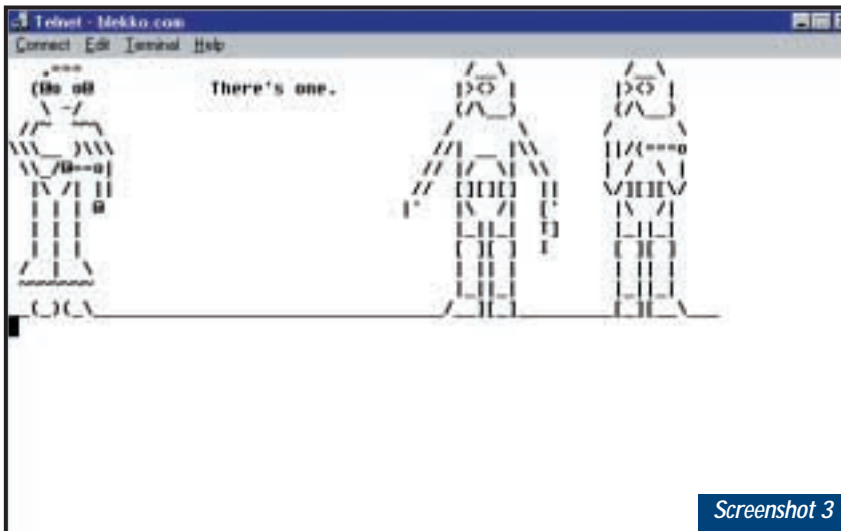
ansi.sys, as ST Payne found out after upgrading from Windows 98. An important DOS-based program used some ANSI routines and hence needed ansi.sys loaded. The way around this seems to be to create a Startup disk from Control Panel, Add/Remove ... then edit the config.sys in that to include the line DEVICE=C:\WINDOWS\COMMAND\ANSI.SYS. Then close down Windows, and reboot from the floppy disk. Which takes absolutely ages. Microsoft is aware of this problem and has published a document on it: read article Q273780 at <http://search.support.microsoft.com/kb/c.asp>. This doesn't really add more to what I've just written, apart from the intensely irritating 'STATUS: This behavior is by design'. Another solution would be to install boot manager software, but that is rather drastic.

Mr (or Ms) Payne resolved the problem by reverting to Windows 98 – 'thanks to Drive Image – how often has this program saved my life?' but there is another way. There are various substitutes for ansi.sys that will run from the command prompt or from a batch file. One such, unsurprisingly named ansi.com, is available for download from Rob van der Woude's website (www.robvanderwoude.com). The page also gives the lowdown on all the weird and wonderful things you can do with ANSI commands, such as the rather fine apple shown in screenshot 2, which is the



Screenshot 1

Windows unzips itself



Screenshot 3

Star Wars: full-motion ASCII at a console near you

result of using the TYPE command to display a text file.

While we're on the subject of character-based screens, I've recently discovered what must be the ultimate in retro-chic, neatly combining those seminal sources of geekery, *Star Wars* and ASCII art (screenshot 3). Connect your computer to the Internet, then from Start, Run, type in 'telnet blekko.com'. Once connected, type 'starwars', then sit back and watch the movie in glorious animated ASCII. There's loads more simple fun you can have here – jokes, Tetris and the classic Colossal Cave adventure game. HTML? Shockwave? Quicktime? Who needs them?

Defrag death

Just as I was about to wrap this month's column up, a little message popped up on the screen saying I should 'update'. Normally, this sort of thing is counter-productive as it sends me straight to the 'Disconnect' button, but this time I let it do its thing, just out of curiosity. This was Microsoft Me wanting to install some new bit of help and tell me some news. So I saved everything, closed down and restarted, as requested. Up came the help screen, telling me to click on a link to go to online support. Now maybe I'm not entering into the spirit of things here, but why could Windows Me Update not download the document with whatever it just did download? Anyway, this one is a corker. After you upgrade to Windows Me and run the Windows Defragmenter or a third-party defragmenter, you may get one of a variety of error messages,

when you attempt to restart, warning of problems with User32.dll, Gdi32.dll or Winmm.dll. Apparently, these files may have been corrupted by Cmpieng.vxd, and the solution is to boot from a Windows Me floppy, rename the corrupted files and extract new ones from the CD. Assuming you have the CD, that is.

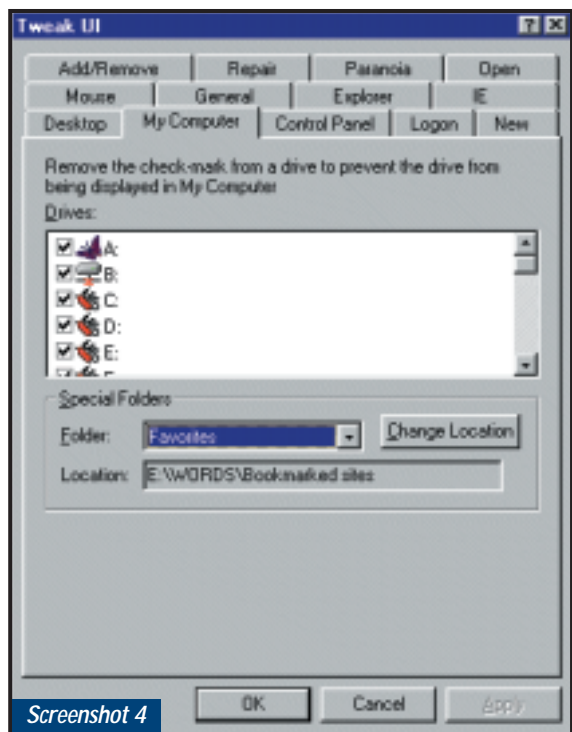
You should then rename the offending Cmpieng.vxd to Cmpieng.vxx. Apparently it's all the fault of Network Associates products such as Cybermedia's Oil Change, Uninstaller version 5 and earlier, Guard Dog version 2.5 and earlier, First Aid 97, 98 and 2000, McAfee Utilities 3.0, McAfee Office version 2 and McAfee Office 2000 (version 3.0). You should be safe with Uninstaller 6, Guard Dog 3, McAfee Utilities version 3.1 and McAfee Office version 3.1 (and later versions of these) which don't contain the Cmpieng.vxd file. If, like me, you tend to ignore these 'time to update' messages then you can read the article by searching for Article Q275003 on the MS support site (<http://search.support.microsoft.com/kb/c.asp>). This gives full instructions for replacing the corrupt files

from the DOS prompt, so do download and print it before you defrag.

Favourite things

You never know how much you value something until you lose it. Take the Favorites folder (excuse the spelling), where Internet Explorer stores links that you might want to return to. In fact, initially it stores loads of links that it thinks you might want to return to, such as Fox Sports and Is Your Operating System Genuine? But over a period of time you've probably got rid of most of these and added your own. The Favorites folder is a sub-folder of Windows, so if in a fit of rage you delete the latter in order to re-install, then you'll have lost them. In fact you will lose anything that's stored in Windows\Application Data or your Outlook files, and so on. I've remarked before how daft this is and how hard it makes devising a sensible backup strategy, but in the case of the Favorites folder there are a couple of things you can do.

One is to use TweakUI to change the location of this folder (screenshot 4). There are a three gotchas here. One is that you must be careful (and the new TweakUI warns about this) not to use another 'Special' folder. Second, you can only specify an existing folder – you can't create one on the fly – so create the new



Screenshot 4

Put your favourites where you want them



Above: Save your favourites to an HTML page

Right: Customising System Properties

target folder in Explorer before firing up TweakUI. The third is that changing the location in this way doesn't copy your existing links across – you'll have to do that manually.

Another way of protecting your Favorites is by exporting them. If, in Internet Explorer, you go to File, Import/Export, a little Wizard will help you to export the contents of your Favorites folder to an HTML document (screenshot 5). This document can be re-imported, which makes it useful for backup purposes, but it also functions as a standalone web page on your hard disk, containing its own links to all your bookmarked pages. You can use this as a substitute for the Favorites folder at a pinch, and you can drag links from it into an existing Favorites panel in Internet Explorer.

Top tips

Ross Aveling sent two little-known tips. First, if you double-click a folder entry below Programs in the Start Menu, it will open it folder-style rather than as a menu. Second, with a folder open, you can drag out the icon at the left of the title bar to create a shortcut to the folder.

In November's column, I said you could create a text-format backup of DUN entries by dragging the entries into another folder. This, it seems, does not work in Windows 95. Apologies to Vivian Dunn and all the others who wrote in about this but had less appropriate names.

Several people also wrote in to say there are better

[support information]

```
Line1=in case of disaster, ✓  
call  
Line2=555-1234  
Line3=or e-mail  
Line4=support_bod@my. ✓  
company.co.uk  
Line5=you can have up to ✓  
ten lines of this...
```

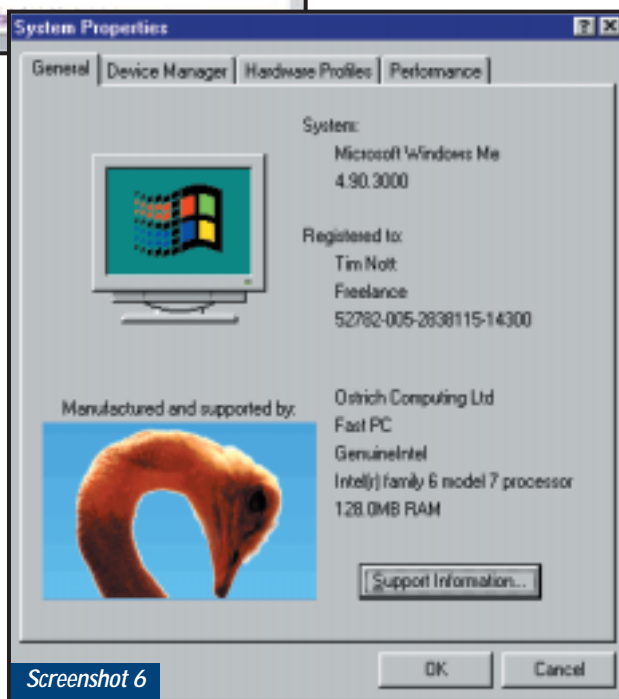
(Key: ✓ code string continues)

Save this in the Windows\System folder as oeminfo.ini. The information in the [general] section will appear in the System Properties, General section – right click on My Computer and select Properties to see it.

The second section adds a 'Support Information' button to the dialog; clicking this reveals the rest of the information in a separate box. To put the cherry on the cake, you can add a logo. This should be a bmp file no larger than 180pixels wide by 114pixels high. Save it in the Windows\System folder as oemlogo.bmp and it, too, will appear in the System Properties box (screenshot 6).

'Don't lose this number!' It says this on the Windows 98 CD packaging. And you will need the number if you need to reinstall. If you have lost the packaging, then don't despair. You can find it by running Regedit and going to HKey_Local_Machine\SOFTWARE\Microsoft\Windows\CurrentVersion. In the right-hand pane you will see an entry for 'Product Key'. This is the number you need. Write it down or better still have it tattooed somewhere on your body. For Windows 95 it's slightly different. In the same Registry location look for 'Product ID'. Knock off the first five and last five numbers from this to get the original CD Key.

Finally, thanks for your entries in the Mascot for Windows contest, which are still trickling in. Robin Kelland suggests a Magpie. Sam Edge suggested a friendly killer whale, or Orca, because these are known to eat penguins. Finally, Ian J Kennedy predicts that Windows 2001 will ship with a free cuddly lemming. Enough, I think.



Screenshot 6

ways to deliver a message saying who built the PC than putting ECHO entries in autoexec.bat (December's Question Time).

In particular, Seanie Ming, pointed out a less fleeting reminder. We've actually done this one before, but as it was over two and a half years ago, perhaps it merits revisiting. So, first create a text file containing the following:

```
[general]  
Manufacturer=My Company Ltd  
Model=Fast PC
```

CONTACTS

Tim Nott welcomes your comments on the Windows column. You can contact him via the PCW editorial office or email: win@pcw.co.uk. Please do not send unsolicited file attachments.



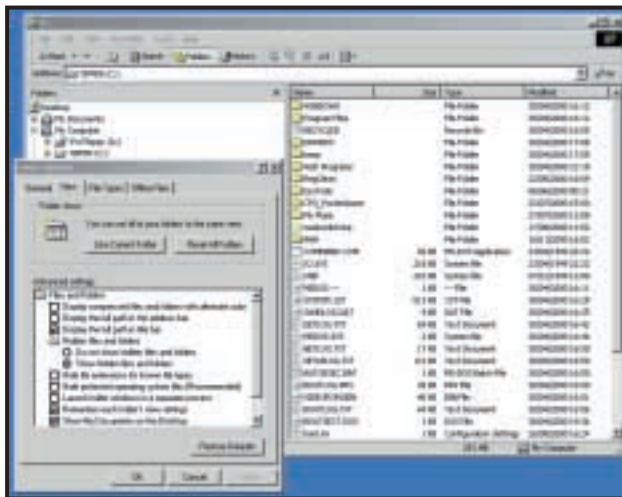
Startup faster

Terence Green details the Windows 2000 Startup sequence and offers tips on saving time

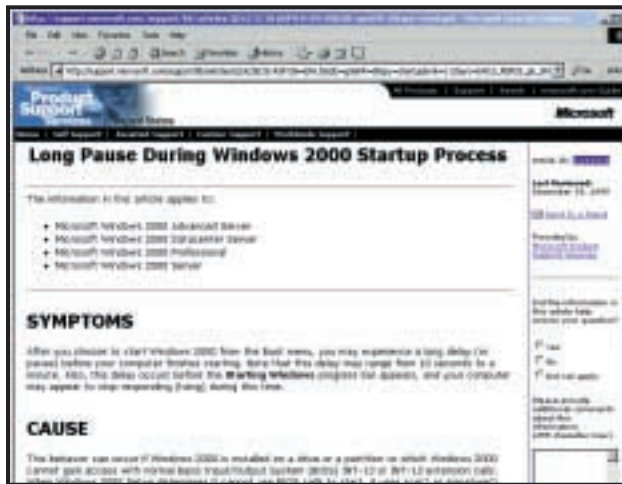
A reader who signs off as 'AJC' is puzzled by the Windows 2000 Startup sequence and wants to know if the process can be speeded up at all. The 'Starting Up' screen with that progress meter is quite a talking point, by no means confined to obsessives like me who watch it over and over again trying to make sense of it all. Witness the Tom Waits song, *What's He Building* from his 1999 comeback album, *Mule Variations*. This classic tale of urban alienation is clearly influenced by an early beta copy of Windows 2000. Typically prescient, Bob Dylan said, almost four decades ago: 'Something is happening and you don't know what it is, do you Mr Jones'.

The Startup process is normally slower than for Windows 98 because it accomplishes a lot more and results in a more reliable operating system. It includes periods of high disk activity, during which it is obvious that a lot is happening, but these are interspersed with other processing activity when it might seem that nothing is going on. During these quiet periods, Windows 2000 is processing data or starting up drivers and services. It's possible up to a point, but not always advisable, to reduce the time taken at this stage by tinkering with the Startup drivers and services. Sometimes a lot is going on behind the scenes but no progress is being made.

This can happen if a configuration error causes Windows 2000 to use a slower disk access driver or to retry a procedure multiple times. Diagnosing the causes of these delays will make a difference to the Startup time and will



By default you cannot view the hidden Windows 2000 system files on the boot drive



The KnowledgeBase explains why Signature indicates slow Startup for some users

also improve stability, so it makes sense to concentrate your efforts here.

When you switch on a PC and boot into Windows 2000 the system runs through a series of device tests and configuration checks including plug-and-play device configuration. Most of the configuration that would be carried out by the BIOS is deferred when ACPI, the preferred power management option for Windows 2000, is enabled in the BIOS. Up to this point all you can do to speed the loading process is to ensure that the

hardware and BIOS are correctly configured. Some of the choices you make here will have an effect later. For example, if you have USB enabled in the BIOS but don't have any USB devices, Windows 2000 will still spend time processing core USB drivers later in the Startup process.

Next, a PC will identify the first hard disk with an active partition, find the master boot record to identify the drive configuration, and load the bootstrap loader from the partition boot sector. The bootstrap loader locates the operating system boot loader. For Windows 2000 it's the hidden NTLDR file in the root of the boot drive. From here on Windows 2000 is officially being started. NTLDR gets the critical hardware for the system sorted out. By the time you get to the blue and white graphical screen, NTLDR has optionally displayed a menu (for multiple operating systems), flashed up the text-based Starting Windows screen, got the boot process started, prepared the computer for multitasking and started the file systems. If the black and white text screen progress bar hangs around for longer than 10 seconds or doesn't appear at all, take a

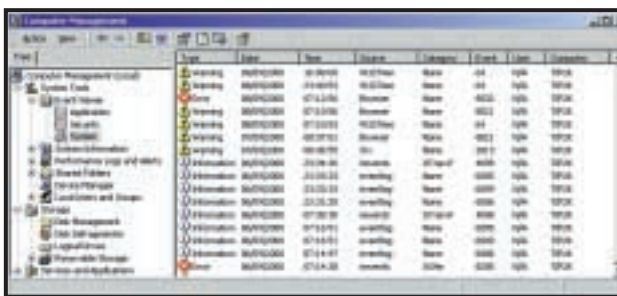
peek at your boot.ini file. This is a hidden file in the root of the C: drive. Use Tools/Folder Options/View to show hidden files. Right-click on boot.ini and look for the word 'signature'. If it's there, look at KnowledgeBase article Q242518 and the linked article under 'More Information'.

NTLDR ends by running ntddetect.com to gather hardware data that it passes to ntoskrnl.exe, located in the %SYSTEMROOT% folder (usually \WINNT). At this point the blue and

white Startup graphic displays and Windows 2000 starts processing the hardware configuration and loading the core system files which make up the kernel of the operating system. Quite a bit of the Startup time that elapsed before the graphic screen comes up is reflected in its blue progress bar.

During this time the hard disk lights should be flickering on and off as files are loaded. Then the graphic comes up, disk activity ceases and the bar starts to fill to about 50 per cent quite quickly. This is the sign of a working disk system. If the system hangs about at this time, the files on the system drive may be corrupt or overly fragmented. Regular maintenance of the system drive with the defragmenter can prevent this happening.

Between 50 per cent and about 70 per cent on the progress bar, some big files are opened and the disk drive may be quite active for short periods but not continuously. This period also includes some hardware detection and loading of critical Startup files. These files are among those listed under 'Services' in Computer Management. Disabling unnecessary services may cut Startup time by a fraction but it could also disable Windows 2000. It's best left to experts and inveterate fiddlers! This period up to 70 per cent can take quite a long time if there are hardware problems or if the services start up slowly because of glitches. Entries in Event Viewer or exclamation marks in Device Manager



Computer Management's Event Viewer helps troubleshoot delays

(both in Computer Management) may throw some light on the situation.

Once this phase is completed, around the time the keyboard lights flash, the remaining services are loaded. If the keyboard lights don't flash there may be a problem with the keyboard and mouse driver. It's a combined driver so changes to the mouse or keyboard can affect it. Many of the network services are loaded during this final phase. An incorrect

network configuration can cause delays here. For example, if the system has been set to expect automatic (DHCP) configuration it will try several times to find a DHCP server before falling back to a default position. As this final stage progresses, the drive starts to clatter regularly and Windows 2000 lifts off. The blue background of the desktop comes up and the Windows logon and networking connection are made. If the desktop fails to appear there might be a video card configuration problem which restarting in VGA mode would confirm.

That's more or less the whole story. For most people, Startup problems revolve around drive detection and

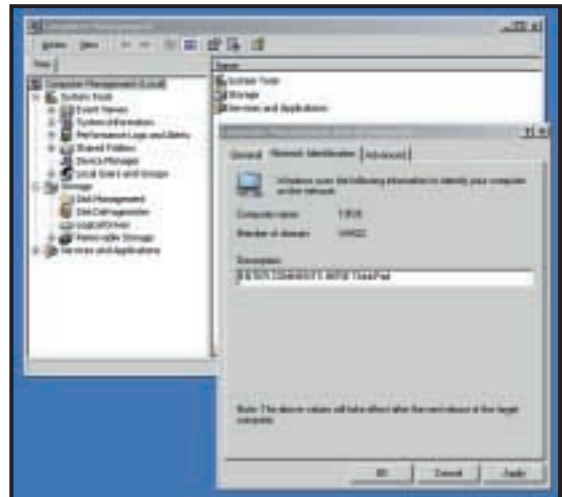
access. The next major pain is networking configuration. These are nature versus nurture, so to speak, because they form part of the basic operating system.

Problems of nurture stem from dodgy device drivers and peripherals that behave badly. They are easier to detect if you keep a change log and note down important configuration changes. In a very rough sense, nature is the first half of the

Startup process. Look at the basic hardware configuration to speed this part up. After that, nurture takes over and glitches in the second half of the progress bar are most likely to stem from new components or tinkering with the setup.

Readers write back

Richard Wylde discovered an annoying little Windows quirk (haven't we all!)



Network comments located. It looks just like the other dialog box that doesn't work

with the network comments field, basically summarised as 'where on earth is it?' Hidden in Computer Management of course! From the Desktop, right-click

Disabling unnecessary services may cut Startup time but could also disable Windows

on My Computer, and select Manage. Under the Tree tab, right-click on Computer Management (Local), select Properties and click on the Network Identification tab. Enter at will.

Having prompted the discussion of Startup, AJC closed with a pointer to Ultrabac, a backup utility from www.ultrabac.com that is free for home use. To that, add Innoculate from antivirus.cai.com, a virus utility that is also free for personal use. Previous versions sometimes glitched on Windows 2000 but the version now available for download seems fine. Anti-virus programs are a must these days and they should be updated regularly. Checking for updates every week is not at all an overreaction to the threats out there.

CONTACTS

Terence Green welcomes your comments on the Windows 2000 column. Contact him via the PCW editorial office or email: win2000@pcw.co.uk. Please do not send unsolicited file attachments.



Fine tuning performance

Roger Gann gives NT4 a tweak with the aid of its built-in Performance Monitor

Probably one of my more dangerous mottos is 'If it ain't broke, tweak it' and the more tweakable something is, the greater the temptation to monkey around with it, trying to squeeze out the last drop of performance. This is especially true of Windows NT4, which has configuration options as long as your arm. But how do you go about optimising a PC or server running Windows NT4?

Well, you won't have to look too far, that's for sure, as you already own one of the best tuning tools – Performance Monitor or PerfMon to its friends. This utility lets you track variations in the use of system resources over time, and set alerts on the use of specific resources. You can even monitor systems remotely, which is a great help in tracking down problems on your network. And Performance Monitor can measure application performance, not just operating system performance.

The basic tool used for troubleshooting performance issues is Performance Monitor. To collect performance data follow these steps. First of all, turn off screensavers permanently and then disable all non-essential services with the Services tool in Control Panel. For all possible disk issues, enable Diskperf. To do this, open a Command Prompt and enter this command:

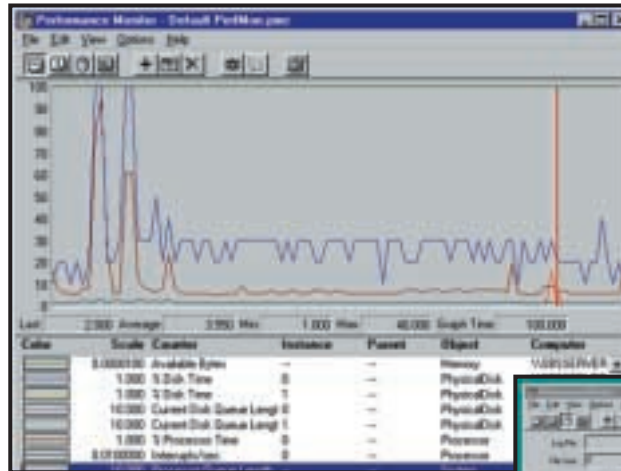
```
diskperf -y
```

If you are using RAID, enter:

```
diskperf -ye
```

You will see the message: Disk Performance counters on this system are now set to start at boot. This change will take effect after the system is restarted. Microsoft added this step because monitoring disk performance imposed a one to two per cent performance hit on a 386-based system but I think we can live with that today! And if you are worried about this, well you can even use PerfMon to track itself and see how much of a burden it is to the system.

When you first open Performance



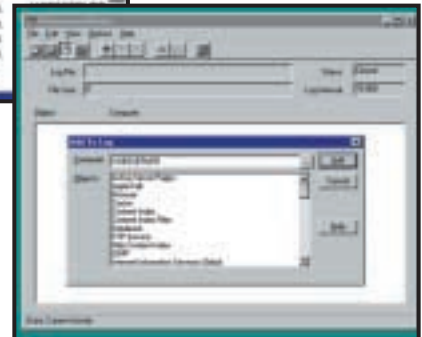
Left: PerfMon allows you to track variations in the use of system resources

Below: In order to make the most of PerfMon, data needs to be logged on a regular basis

Monitor, you see the blank Chart screen. You must select which objects, instances, and counters to monitor. An object is any system component that has a set of measurable properties. An object can be a physical component (such as a hard disk, memory or a CPU), a logical component (such as a disk volume) or a software component (such as a process, a thread or a redirector). An instance shows how many occurrences of a particular object are in the system. Each object has multiple counters, each of which is a measurable attribute of the object. So, for example, the Processor object has several counters, including the percentage of processor time in use and percentage of time the CPU spends in Privileged and User modes.

You can, of course, just view the graphs that PerfMon displays but to do any serious work with this data, we need to log it. So, on the View menu, select Log. On the Edit menu, select Add To Log. In the Add To Log dialog box you will see Computer and Objects. In Computer, specify the name of the local computer or a remote computer you want to get a log of. In Objects, add the counters that you want Performance Monitor to log. These counters will change depending on the problem that you are troubleshooting. Highlight the objects that you wish to monitor and select Add. Under Options select Log. Under File Name, name the log.

At the bottom of this window you will



see Update Time. It is important to get this value right. If you're going to be running the Performance Monitor log for an extended period of time, you will want to set this update time to an interval much higher than 15 seconds or the log will be very large. If you are only going to be running the log for an hour then 15 seconds will be fine. Whatever you do, don't overdo it on the data collection front – Windows NT4 has a log file limit of 2.1GB (under Windows 2000 it is a meagre 1GB!). For example, if you monitor the objects LogicalDisk, Memory, Process, and System, the log grows by about 10KB each time PerfMon updates it. If you monitor every 10 seconds, after a 12-hour period the log will be about 40MB.

Now you are ready to start the log. Press the Start Log button located in the same window as the steps above. This will start the log and the icon will change to Stop Log.

When you're ready to stop monitoring the selected objects and examine your logged performance data, under Options, select Log and Stop Log. Under the Options menu select 'Data

from' and 'Log File'. Now select the radio button beside the perfmon.log field and locate your log file. Note – choosing File and Open won't open a log file.

After opening the log file, add the objects and counters that were monitored. Do this for each view needed, otherwise the log file's data will not be available.

The counters you should actively monitor will vary depending on the problem that you're troubleshooting. For example, if you're troubleshooting a performance issue or an issue that looks like a memory leak, the objects that Performance Monitor should log include, but are not limited to, the following:

- Memory
- Objects
- Cache
- Network interface
- Paging file
- Physical disk
- Process
- Processor
- Server
- System
- Terminal Services (if the system is a Terminal Server).

For all other resource issues, add additional counters:

- Logical disk
- Redirector
- Server work queues
- Thread
- All job counters (if ADV Server or Datacenter)
- All Terminal Server counters (if a Terminal Server)
- All Protocol counters bound to network adaptors.

Don't confuse the Process and the Processor objects. The Process object represents a running program, in other words, an object using system resources. Its counters track how much of each system resource the process is using. The Processor object is the CPU, which is a system resource. Some counters, such as %Processor Time, appear in both objects, so you have to be careful which object you select when you pick the counters.

Analysing the data

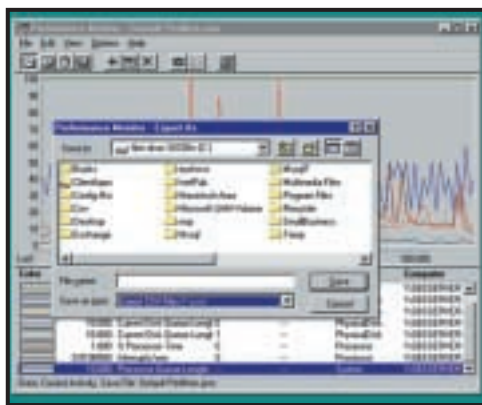
Originally, for some mad reason, the logs created by PerfMon couldn't be exported by default, and so couldn't be further analysed by spreadsheets or databases. If you wanted to do this, you had to fork

out for the Windows NT4 Resource Kit in order to avail yourself of the PerfLog service. However, this feature has now been dropped from the RK as PerfMon, somewhere along the line of Service Pack upgrades, has now sprouted the ability to export its log data in either comma or tab separated format, thus allowing you to bring automated analytical tools, such as dear old Excel, to bear on any performance

problems you might be experiencing.

In fact, John Savill has written an Excel macro to simplify the task of analysing the PerfMon data even further. You can download it from www.savilltech.com. John suggests you start logging the following counters:

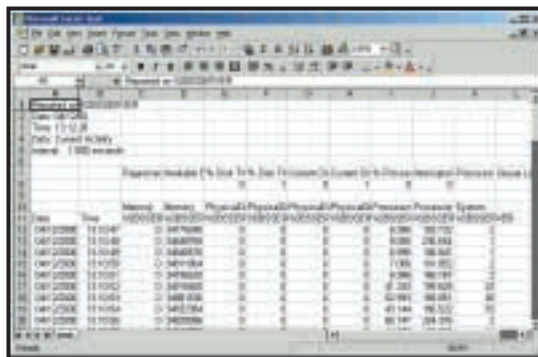
- Memory-Pages/sec
- Memory-Available Bytes
- PhysicalDisk-% Disk Time
- PhysicalDisk-Current Disk Queue Length
- Processor-% Processor Time
- Processor-Interrupts/sec
- System-Processor Queue Length



It is now possible to export the collected data into another package, such as Excel

Then let the monitor run for a while and perform your normal day-to-day operations. After a suitable period has elapsed, select 'Export Chart' from the file menu, give it a filename and save it.

Next, start Excel and open a new blank spreadsheet. Select Open from the File menu, select file type 'Add-Ins' and drill down to the folder where you extracted perfmon.xls to Select it and click Open. Select Open from the Planning menu, drill down to the log file



An Excel macro available from www.savilltech.com helps simplify the PerfMon data

and open it. Select Bottlenecks from the Planning menu and it will give a list of possible bottlenecks. Selecting one will give more detail in the Suggestions area. Click OK when you are finished.

If you're feeling particularly inquisitive and have enough data, you might like to apply some statistical analysis to the data you've collected. Spreadsheets, like Excel and 1-2-3, make it easy to perform regression analysis to detect/project trends. Most of the data you collect will be linear by nature and simply charting the data will let you extrapolate an existing line. Spreadsheet programs also incorporate sophisticated forecasting tools as well, for example predicting when your server's CPU will eventually run out of steam and need to be upgraded.

After you've identified the resource that's causing the bottleneck, you then need to identify the process that is causing the resource use. To monitor the resources that individual processes are using, select Process as the object and select the instance you want to monitor. You can use the instance option to view a list of all the processes that are running, because each process has an instance. You can monitor several of the main counters at a process level.

For an excellent step-by-step guide to using PerfMon, troll over to www.microsoft.com/TechNet/network/netmgmt.asp for the detailed lowdown on this useful tool.

CONTACTS

Roger Gann welcomes your comments on the Windows NT column. Contact him via the PCW editorial office or email: nt@pcw.co.uk. Please do not send unsolicited file attachments.



Mandrake and mounting

Chris Bidmead has some good news about Linux and a bit of advice about automounting devices

A few months ago this column was heavily sceptical about the tightening ties between Mandrakesoft, the French outfit responsible for one of my favourite Linux distributions, and Macmillan, once a book publisher of high repute, but lately just another satellite of the sprawling Pearson empire. By all accounts Macmillan made a lousy job of its first badged version of Mandrake Linux, and now that it's become the sole publisher in the English-speaking world of the i86 implementation of Mandrake I found myself worrying about the future.

Well, the good news is that it's good news. Shortly after I'd written those comments I had a chance to sit down with Henri Poole, Mandrakesoft's new CEO, and VP and co-founder Gaël Duval. It became clear that my vision of a plucky and lucky small company falling into the hands of a cynical international conglomerate was way off. Despite his Frenchified first name, CEO Poole is a seasoned Californian IT honcho, bringing US investment money into the company, and Duval, a hacker from Normandy who looks considerably younger than his 26 years, is as commercially canny as he is code-smart.

Both of them are serious open-source devotees, as evidenced by Mandrakesoft's recent accession to the Advisory Board of the Gnome Foundation, and they have very firm views about how to steer Linux through Microsoft-infested waters. Duval even sees the possibility of Linux being bigger than Windows 'maybe in two years'.

The new Mandrake 7.2 (screenshots of which you can see in last month's column) is a tribute to Poole and Duval's determination to make Linux easy to install and use on the desktop. They also seem to have inspired Macmillan into making important strides in improving distribution – US customers can now pick up Mandrake Linux in the general-purpose cut-price chain Walmart.

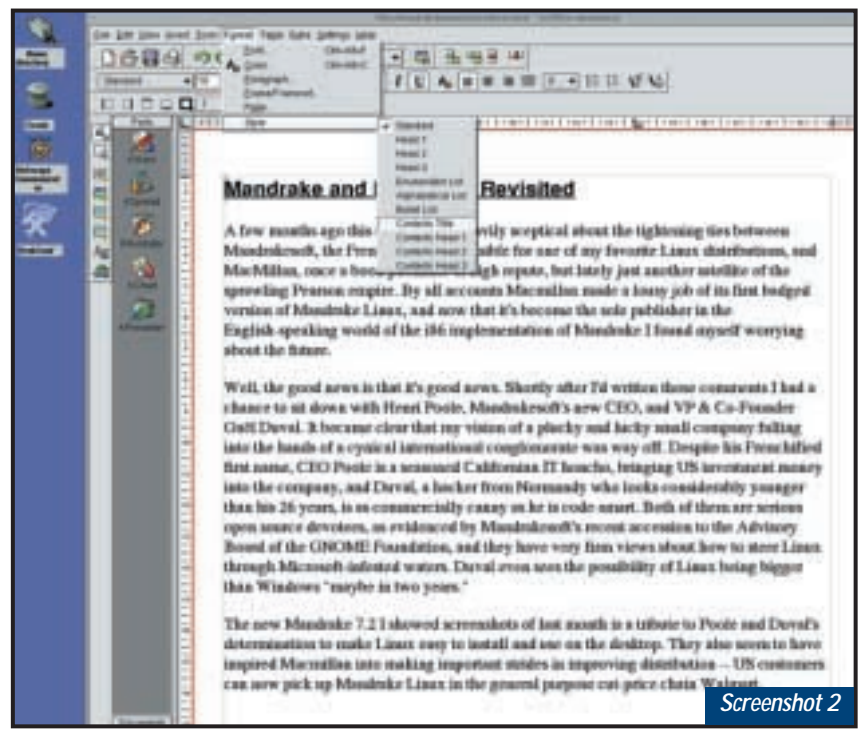
```
[bidmead@t20 etc]$ cat auto.misc
kernel          -ro,soft,intr          ftp.kernel.org:/pub/linux
cd              -fstype=iso9660,ro,nosuid,nodev :/dev/cdrom

# the following entries are samples to pique your imagination
#boot          -fstype=ext2           :/dev/hda1
#floppy        -fstype=auto           /dev/fd0
#floppy        -fstype=ext2           /dev/fd0
#e2floppy      -fstype=ext2           /dev/fd0
#jaz           -fstype=ext2           /dev/sdc1
#removable    -fstype=ext2           /dev/hdd

[bidmead@t20 etc]$
```

Screenshot 1

This is the /etc/auto.misc table discussed in the text. One really neat thing about autofs is that you can add new lines or edit existing lines in this file without having to restart the autofs daemon



Screenshot 2

Mandrake 7.2 includes the initial release of the KOffice suite. This includes the KSpread spreadsheet; a vector drawing application, KIllustrator; a word-processing application called KWord; a presentation program, KPresenter; and KChart, a chart and diagram application. All are shown here wrapped in the KOffice Workspace

Let's mount again...

In last month's column I was answering a query from Jonathan Weir (jonathan.weir@btinternet.com) about mounting devices, and I covered the basics of the mount command and the /etc/fstab configuration file. But the first question that users coming to Linux from

Windows ask is, why do we have to do all this stuff anyway? Under Windows, if you want to look at a CD-ROM you just stick it in the drive. Likewise Floppy disks.

The answer is that the mounting process is going on in both these cases, it's just that with Windows you don't get to see it – the devices are automounted

behind the scenes. And when processes that you don't get to see go wrong, they tend to be much more difficult to fix. One of the things I really like about Unix in general is the transparency, the sense that, once you've developed a basic understanding of what's happening, there's no 'magic'. Just technology, and technology that's under your control.

Manual mounting helps develop that understanding, but if you want the computer to take over, you can. Automounting of various kinds has been part of Unix for as long as I can remember, although the general sense of control you develop through using Unix tends to mean – at least in my case – that you don't use it that much. For instance, you can manually mount a DOS floppy drive in a number of ways; read/write, read-only, with or without case conversion of filenames, with or without conversion of text line endings from the DOS to the Unix convention... and so on. Actually you don't have to sacrifice these refinements with a Unix automount system, but this would be relatively complex to set up and normally you'll be making these kind of choices on the fly.

A splendid automounting tool is supplied with Mandrake 7.2, but if your particular distro doesn't have it you can download it from, for example, <http://rpmfind.net>. It's a package called `autofs`, and it works as follows:

First, set up a directory, or directories, under which automounting will be taking place. These directories are defined in a text file, usually called `/etc/auto.master`. Under these directories will be invisible subdirectories with names that we'll be defining in a moment. Each name will be associated with a particular automount.

Next, for each automount directory defined in `/etc/auto.master`, create a separate file. Each file will list the automounts that take place in that directory. The act of automounting doesn't happen at the moment you insert a CD or floppy, or connect to the network. It happens when the user, or an application, tries to access the invisible subdirectory underneath each main mount directory.

Now for the specifics (I'm simplifying, and omitting some options). I normally mount floppies, CD-ROM, foreign partition and remote machine directories under the (fairly) standard `/mnt` directory. That's for manual mounts. For the automounts let's create a new

directory called `/misc`. To make this known to the `autofs` daemon (I'll come to that in a minute) we enter a line into `/etc/auto.master` that looks like this:

```
/misc /etc/auto.misc ✓
-timeout=60
(Key: ✓ code string continues)
```

The first field defines the master mount directory, which we create with `mkdir`. The second field is the name of the file where the individual automounts underneath `/misc/` are to be defined. And as you may have guessed, the last field defines the time in seconds following an access to any of the automount directories when the mount is to be relinquished.

Now we can start the automount daemon, which will typically live among the `SysVinit` runlevel scripts in `/etc/rc.d/init.d`:

```
/etc/rc.d/init.d/autofs ✓
start
```

If it's already running (kicked off by the runlevel we're currently in – the Mandrake default is runlevels 3, 4 and 5) we'll say 'restart' instead of 'start'. We can also use the 'status' switch to see whether the `autofs` daemon is up, and if so, what the mount points that it controls are doing.

But before anything useful can happen we're going to have to create that `/etc/auto.misc` file. Your distro may already have it in place, but you will almost certainly need to edit it for your own purposes. By default the Mandrake 7.2 `/etc/auto.misc` file looks like screenshot 1 opposite.

The first line is supposed to be an automated ftp login to the Linux kernel site at `ftp.kernel.org`. I can ftp to this site in the ordinary way, and have a continuous-on Internet connection, but I can't get it to work as an automount, probably because I'm behind a firewall. The second line obviously automounts the CD-ROM as an `iso9660` filesystem. The remaining lines are commented out; you can uncomment them to add floppy, Jazz or other support.

I added a few lines of my own:

```
hda8 ✓
-fstype=ext2 ✓
:/dev/hda8 ✓
```

*The aerial of the RangeLan2 PC Card extends from the side of the IBM T20 Thinkpad like a small rubber ear.
Photo courtesy of Dave Williams*

This is quite straightforward: it mounts what happens to be the root of my previous, 7.1, Mandrake installation on the logical partition `/dev/hda8` so I can access it while I'm running 7.2 (rooted on `/dev/hda1`). Obviously this could equally well be done with a permanent mount defined in `/etc/fstab`.

```
bidswon - ✓
rw,soft,intr ✓
pmate:/home/samba/bidswon
```

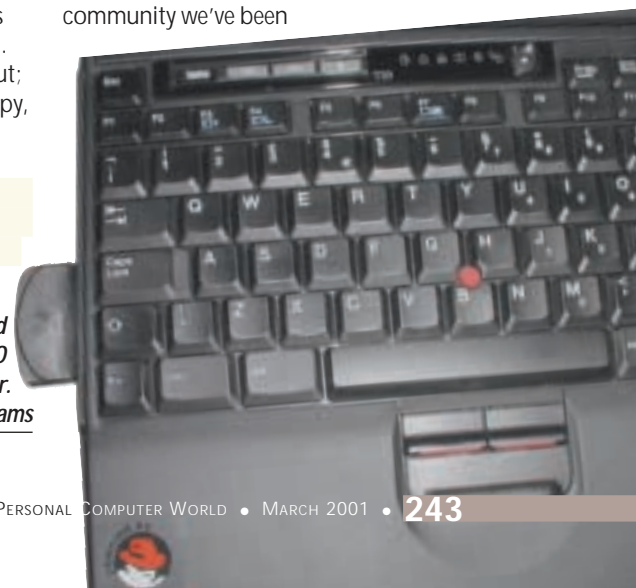
This is an `nfs` mount, the default type that `autofs` expects. This is a case where `mount-as-needed` is more appropriate than a permanent `/etc/fstab` mount.

```
winpersonal -fstype=smbfs, ✓
username=win,password= ✓
redmond ://sinatra/ ✓
winpersonal
```

This is one I cooked up myself with a little help from the somewhat under-documented man pages. In this case an NT server called `sinatra` has a shared directory called `winpersonal` belonging to a user called `win` whose password is `redmond`. It's an `smb` filesystem mount against the automountpoint `/misc/winpersonal`. The trick to notice is that the leading colon in the final field (normally indicating a local device) is needed here in front of the `smb` double slash. The main page for `autofs(8)` illustrates this; what it doesn't tell you is how to incorporate the username and password into the mount definition.

Wireless at last

I feel pretty privileged to be able to sit here at a shady table at the end of the garden, surfing the net from a laptop with no wires in sight. But as regular readers will know, this column isn't about privilege. Quite the reverse – the aim is to write about Unix stuff that everybody can do. Well, thanks to the sterling work of the free software community we've been





The RangeLan2 Access point is light enough to attach to the bannisters of the Bidmead staircase with a single elastic band. Photo courtesy of Dave Williams

exploring over the past few months, Unix can certainly do wireless networking. But can your budget?

Last year's Comdex at Las Vegas was awash with wireless, and there's no doubt that what I'm doing here on the Bidmead estate with my trusty IBM T20 Thinkpad and the Proxim RangeLan2 technology (denoted 'very cool' by my own children, so it's official) will soon be commonplace. Yes, the Proxim kit I have here on loan is pricey, but with the increasing availability of wireless solutions that is set to change.

When I first started writing about Ethernet networking back in the early 1980s, a 10Mbps/sec card for a workstation cost a couple of thousand pounds. Now you can pick one up for less than a tenner. Wireless network prices are going to fall a lot faster than that. By the time you read this, expect to buy an Access Point for around £500 and a wireless PC Card for around £100 and a pop. Proxim has also introduced a

Compact Flash wireless adaptor, so you'll be able to put your PDA (running Linux, I hope) on the network too.

Last month we created the `rlmod.o` module to match the 2.2.17 Linux kernel running on my Thinkpad T20. It installs in `/lib/modules/2.2.17/net`, and my first shot was to run `insmod rlmod` with `pcmcia` running and the PC Card in place and hope it just worked. It didn't.

Dave Koberstein has set up a maillist for his Proxim driver, and there I was politely referred back to the docs in the `rl2_driver.tgz` tarball. The idea is to let the PC Card `cardmgr` daemon take care of loading the `rl2mod` module, and you can do this through a config file called `/etc/pcmcia/config`. In effect this is a simple database linking the name each PC Card reports itself by on loading with the appropriate module, each entry being a separate stanza. The stanza the RangeLan2 card needs is:

```
card "Proxim RangeLAN2 7200"
PC Card"
```

```
version "PROXIM", "LAN
CARD", "RANGELAN2"
bind "rlmod"
```

The Red Hat distribution puts a catchall line near the bottom of `/etc/pcmcia/config` that says:

```
source /*.conf
```

In other words, look for any file called `<something>.conf` and include it. So instead of editing the config file you can simply add a new file, say `rlmod.conf`, that includes the stanza.

This makes sure the driver is loaded when the card is inserted, but you'll also need to bring up the network. Dave Hinds, the PC Card package originator, has automated this by ensuring `cardmgr` runs a script called `/etc/pcmcia/network` when a network PC Card is inserted or ejected. As scripts go it's pretty hairy; luckily I didn't have to mess with it other than note that it looks for local configuration in two files called `/etc/pcmcia/wireless.opts` and `/etc/pcmcia/network.opts`, and filling in the values here is made easy by copious comments.

With the RangeLan2 card inserted, my ThinkPad T20 now has two Ethernet interfaces: the built-in wired Ethernet Express 100 and the wireless interface. To keep track of these I decided early on to compile the kernel with the `eepro100` support to simplify the module shuffling. When the RangeLan2 card comes up I want it on `eth1`, and I want to take down the `eth0` interface. `/etc/pcmcia/network` includes placemaker routines called `start_fn ()` and `stop_fn ()` which you can fill out in `network.opts` by adding:

```
# Extra stuff to do after
setting up the interface
# added chb, take eth0 down
# take eth0 down once eth1
is up
start_fn () { ifconfig eth0
down ; return; }
# Extra stuff to do before
shutting down the interface
# added chb, bring eth0 up
again
stop_fn () { ifconfig eth0
up ; return; }
```

CONTACTS

Chris Bidmead welcomes your comments on the Unix column. Contact him via the PCW editorial office or email: unix@pcw.co.uk. Please do not send unsolicited attachments.



Improving your memory

Gordon Laing investigates DDR technology and the time benefits of increased RAM

In a packed Hardware column this month, we've got the facts about Double Data Rate (DDR) SDRAM, the impact of memory when printing and important compatibility issues between new hard disks and older motherboards, along with news of some seriously cool products.

Everyone knows that extra memory can seriously improve your PC's performance. After all, when you run out of available RAM, the operating system starts relying on virtual memory, which is nothing more than portions of your hard disk pretending to be RAM. Certainly, it may allow you to have loads of applications running at once, or to open unfeasibly large files, but even the world's fastest hard disks operate at a fraction of the speed of RAM.

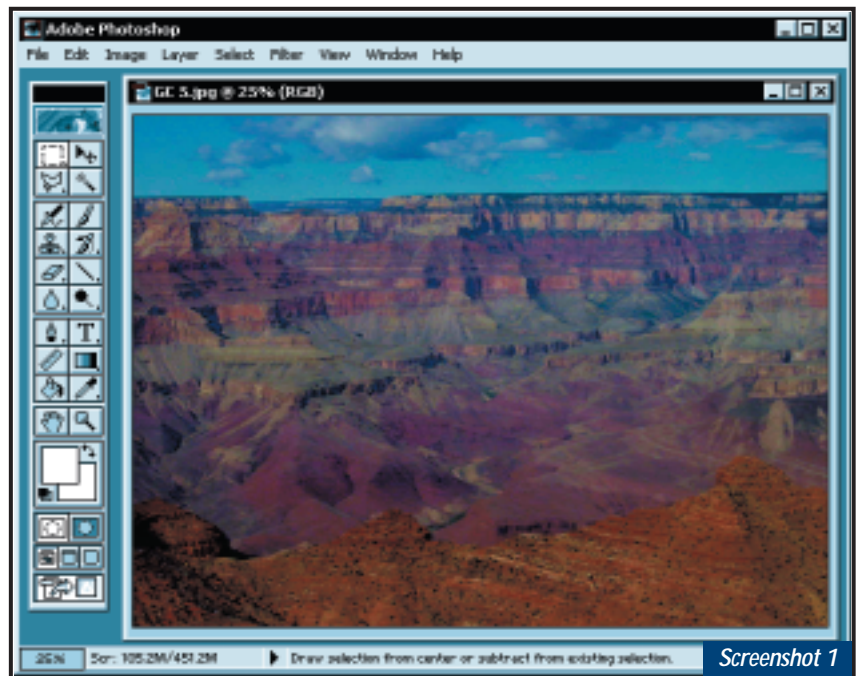
In tests and everyday use, the difference that doubling your memory makes can be nothing short of monumental. Whether it's going from 8 to 16MB, 16 to 32MB, 32 to 64MB or 64 to 128MB, you'll immediately notice a big difference in overall handling.

So far nothing new, but the big question is where do you stop? Will you continue to see any benefit doubling from 128 to 256MB, 256 to 512MB, or even all the way to a gigabyte or higher?

More RAM really can make life better – even if you're just printing digital camera pictures

In extremely general terms, many people claim that 128MB is about as far as you'd need to go on a single-user system, unless you're into heavy photographic, video, audio or database usage. The problem is that few people seem to go into further detail. As a relatively major photographic user myself, I thought that I would put the effect of extra memory to the test.

My main system is an 866MHz Pentium III, with a GeForce2 GTS graphics card, Ultra2 SCSI disk sub-



An innocent 3.3megapixel digital camera picture can occupy more RAM than you think. After a handful of operations, it's already consuming 100MB in Photoshop – see the bottom left-hand corner of the screen

system and 512MB PC133 memory – it's all plugged into an old Asus P2B motherboard, whose poor BX chipset is overclocked to 133MHz. You'd think 512MB would be more than sufficient

for basic knocking around with digital camera images and the occasional 30MB film scan, but believe it or not, I was closer to trouble than I thought.

Take Adobe Photoshop for instance. If you want to see how far your memory really goes, try opening a relatively modest file and performing a few operations on it. The numbers to watch are the scratch sizes in the bottom left-hand corner, next to the viewing percentage. The first scratch size is how much memory is currently in use,

followed by the amount available before Photoshop has to start employing your hard disk.

Under Windows 2000, I opened a picture from a 3.3megapixel digital camera, which measured just over 1.2MB as a compressed jpeg. Photoshop, like most imaging applications, immediately considers it as an uncompressed file, which in the case of a single picture from a 3.3megapixel camera, is about 9MB.

For better performance in terms of caching and undos, Photoshop's scratch requirements for this image started at 19.8MB before doing anything at all.

Each brightness, contrast or colour adjustment added 12MB to my scratch size and before long I was at over 100MB (see screenshot 1). Imagine how big this could be if you started with a larger image, or had several open at the same time.

The real killer, however, turned out to be printing. With only Photoshop running, and no actions having been performed other than simply opening

this 3.3megapixel picture, I timed how long it took to prepare for printing on my Epson Stylus Photo 1270. With 512MB of RAM fitted, the image was ready for action in 10 seconds. Removing half the memory, leaving 256MB, also resulted in a 10-second wait. I was, however, surprised to find that dropping to 128MB took my PC two and a half times longer – 25 seconds. And remember, this was simply to prepare a single 3.3megapixel (9MB) picture for printing, without any other pictures open or applications running at the same time – scary stuff.

One of the things I love about digital imaging is producing your own collages of pictures and outputting them on a single large sheet of paper. Good taste aside, I knocked up a quick Quark Xpress document, featuring 15 pictures from my 3.3megapixel digital camera. Each picture may have only been around 1.2MB as a jpeg, but, in the same way as Photoshop, Quark handled each image in the document as an uncompressed 9MB

file. With 15 pictures in the A3 layout, this resulted in a 133MB document for the printer to handle. With 512MB at my PC's disposal, you'd think it no challenge, until you remember what happened with a single 9MB file.

With 512MB, the file took one minute 38 seconds to prepare before printing could begin. Dropping to 256MB increased the time to five minutes 22 seconds, while 128MB took an excruciating 12 minutes 45 seconds. Now, while you may be thinking that just under 15 minutes is the perfect excuse for making a cup of tea and catching up on today's news headlines, a serious technical problem reared its head. Namely that with 256MB or less, one or more pictures were missing on the preview and the final printed output.

Half a gigabyte of RAM had suddenly turned from a luxury into a necessity in order to print my relatively simple collage of pictures. Speaking to other regular



A Quark file with 15 digital camera shots results in a 133MB file, with print-preparation times from one minute 30 seconds with 512MB of RAM to over 12 minutes with 128MB of RAM

users of scanners and digital cameras has revealed similar stories.

So there you have it: more RAM really can make your life much better, even if you're just printing out a few digital camera pictures. If you're into any kind of imaging, and have a 'mere' 128MB of RAM, this could be the most sensible place to start upgrading. Before you go too mad though, check out the maximum amount of memory your motherboard/chipset can support, and if you're considering investing in a large amount of RAM, it could be a good opportunity to switch to the latest, fastest flavours with possibly a new motherboard too.

Of course size, as they say, isn't everything – performance can make all the difference. My system described above uses memory running at 133MHz, but this no longer represents the state of the art in terms of SDRAM – DDR technology has finally arrived for main system memory.

DDR technology has long been employed on high-end 3D graphics card memory, not to mention AGP 2X and AMD's system bus – indeed, AGP 4X and the Pentium 4's system bus are doubled once more with quad-pumped technology. The theory behind DDR is very simple: the actual clock speed remains the same, but data is transferred on both the rising and falling edges of each clock pulse – hence doubling the data rate.

DDR SDRAM does just that, effectively delivering data at 200 or 266MHz, despite having 100 and 133MHz memory clocks respectively. DDR SDRAM is again delivered in the DIMM form factor, but unlike the conventional 168pin flavour, DDR wears a new 184pin guise. This, coupled with having just one notch compared to two on the older type, clearly indicates its incompatibility with existing SDRAM DIMMs and motherboards. If you want DDR SDRAM, then you're looking at a complete overhaul: you'll need a new motherboard and entirely new

DDR memory, as the new slots won't take the old DIMMs.

The first chipsets to support DDR are AMD's own 760 for Athlon and Duron systems only, along with a pair of Apollo Pro266s from VIA, one for Intel and the other for AMD processors. At the Comdex show last November, the Taiwanese pavilion was packed with more support for DDR motherboards than for the Pentium 4. Even Intel, with its close ties with RAMBUS and RDRAM, is said to be developing DDR chipsets.

The naming conventions for DDR SDRAM can, however, be a little confusing. After PC66, PC100 and PC133 SDRAM, you'd be forgiven for thinking that the two new memory flavours would be known as PC200 and PC266, perhaps with the letters DDR for firmer clarification. Instead, 200MHz and 266MHz DDR SDRAM are commonly known as PC1600 and PC2100 respectively.

Rather than nodding to the clock

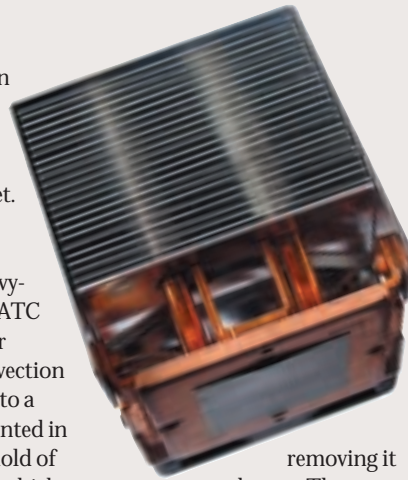


Keeping your cool

It's been a while since I've mentioned any cooling products, so here are the latest from CoolerMaster. The new CH5-5K12 is a heatsink and fan that CoolerMaster claims is designed for both Pentium III and Athlon Thunderbirds up to 1.5GHz. Heat is transferred from the copper base onto the copper fins via a pair of U-shaped heatpipes. The heatpipes allow heat to be quickly transferred from one end of the heatsink to the other, where it's then blown away by

the side-mounted fan – CoolerMaster reckons it's one of the most efficient coolers on the market.

I'm particularly excited about CoolerMaster's groovy-looking aluminium ATC cases. ATC stands for Active Thermal Convection system, which refers to a number of fans mounted in the case itself. I got hold of the ATC-200 model, which has a pair of fans sucking air in the front, and another



removing it at the top. There are three 5.25in and two 3.5in exposed drive bays, and no

CoolerMaster's CH5-5K12 has an Active Thermal Convection system

fewer than six internal 3.5in bays, all kept nice and cool. You'll need to fit your own power supply, but at least it gives you the chance to go for a beefy 300w model. Maplin is one of CoolerMaster's authorised distributors – www.maplin.co.uk www.coolermaster.com Tel: 01908 611 211

frequency, these labels instead refer to peak data transfer rate in Mbytes/sec. With SDRAM's 64bit bus-width, multiplied by two for DDR, then again by 100 or 133MHz for the system buses respectively, you get peak data transfer rates of 1,600Mbytes/sec and 2,128Mbytes/sec (the latter rounded down for its name). Apparently the names PC1600 and PC2100 were used because they sounded more impressive than PC200 and PC266 when compared to PC600, PC700 and PC800 RDRAM.

Like normal SDRAM, DDR is also available in different CAS-latencies. CAS 2.5 PC2100 is also known as DDR-266B, while the faster CAS 2 PC2100 is called DDR-266A.

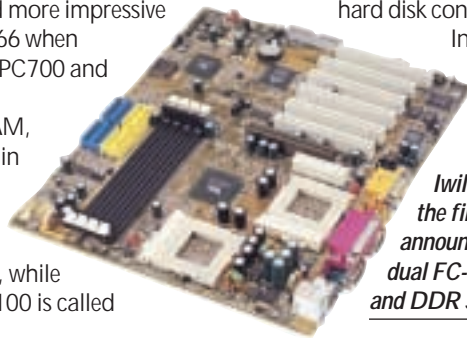
I'm personally very excited about DDR SDRAM. The first systems we've tested at PCW are certainly very quick indeed, and it seems like a much more sensible and affordable high-speed memory solution than RDRAM. I'll probably make the move to DDR when dual-CPU boards become readily available – Iwill has already announced its DVD266-R dual-FC-PGA solution (see photo), and there were strong rumours of other dual-CPU DDR boards from other manufacturers as we went to press.

UltraDMA compatibility

If you're in the market for a new EIDE hard disk, you can't help but notice that every

single one seems to employ an UltraDMA 66 or 100 interface (also known as ATA66 and ATA100). To enjoy the full bus bandwidth of 66 or 100Mbytes/sec, you'll need to connect these drives to UltraDMA66 or 100 controllers respectively, and indeed most new motherboards are fitted as standard with one or the other. But what happens if you've only got an UltraDMA33/ATA33 hard disk controller?

In theory you should simply be able to



Iwill's DVD266-R is the first motherboard announced to handle dual FC-PGA processors and DDR SDRAM memory

connect newer UltraDMA66 and 100 drives to older UltraDMA33 interfaces without any impact, other than the maximum bus bandwidth being limited to 33Mbytes/sec. Certainly, this has been my own personal experience.

Thanks to Bob Crabtree who pointed out, however, that this isn't always the case. It turns out that motherboards employing an Award BIOS dated prior to 28 October 1998 and UltraDMA33 controllers, may prevent newer UltraDMA66 and 100 drives from performing DMA transfers under Windows.

For Windows 95/98-based systems,

the typical symptom is that the DMA check-box in Device Manager for the specific hard drive will not stay enabled after a system reset. The worst case scenario is that under Windows 95/98, the hard drive may be forced to run in MS-DOS compatibility mode until UltraDMA is disabled in the system BIOS. Disabling UltraDMA in the BIOS should allow the drive to operate in PIO Mode 4, but this is still not as preferable as running in proper DMA mode.

After a quick trawl around the support sections of Quantum and Maxtor's websites, I discovered that this is a well-documented problem. While both of these hard disk manufacturers first suggest obtaining a BIOS update that fixes the problem, I couldn't find any suitable updates for my affected boards. Plan B is to download a DOS-based utility that is able to persuade newer UltraDMA66 and 100 drives into thinking they're older UltraDMA 33 models, after which DMA can be enabled in Windows, and happy days are here again.

For Quantum drives, see www.quantum.com/app_notes/award_ata66.htm for more details.

CONTACTS

Gordon Laing welcomes your comments on the Hardware column. Contact him via the PCW editorial office or email: hardware@pcw.co.uk. Please do not send unsolicited file attachments.



Keep order with indexing

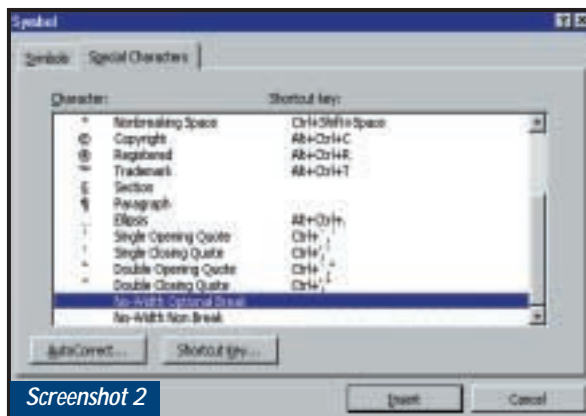
Tim Nott sings the praises of one reader's method of creating concordance files

We were, I believe, talking about concordance files in the January issue, and the surprising fact that Word cannot, off its own bat, construct them. In case you have no idea about what I'm talking about, here's a brief recap. A concordance file is a list of all the 'interesting' words in a document: that is, the ones you would want included in an index. While Word is able to generate an index from such a file it can't create the file automatically. That should be a fairly trivial task: list words, discard uninteresting ones (and, the, very etc) and arrange the rest in alphabetical order.

toolbar, with three buttons and a question mark. One button is marked Keywords, and will generate a list of 'interesting' keywords in a document, which is stored in the document properties. If the document is then saved in HTML format, the keywords are saved as meta-tags and will show up in search engines.

Well, it certainly seemed to add keywords to last month's Hands On Word Processing file. It also changed the title in the Properties box to 'Hnso odPoesn...' (this went on for another 83 words of nonsense). The paragraph button – and I quote – 'will inspect all fields and highlight the five paragraphs containing the most fields'. I did try this and it turned several passages of text a pleasant turquoise.

Now to the indexer itself. This produces one of the strangest dialog boxes I have seen. Run the cursor around it and up pop little pearls of wisdom: 'The geek shall inherit the earth', for example. Some very tiny buttons do strange things such as list all the icon files on your system, or do something peculiar with fonts, which I eventually twigged was for changing the font, colours and other attributes of the dialog box. Do not ask me how this works, but if you press the Index button, things flicker and whirr for a while, and finally an index appears at the end of the document. And on the documents I tried, quite an intelligent one, with very few superfluous entries. You can see for yourself if you go to www.vif.com/users/cgreaves/default.htm and download Indexer.zip.



Screenshot 2
Breaking URLs is possible, but this doesn't work for everyone



Screenshot 1
Chris Greaves' strange but effective indexer

Since January's column, I've made some progress, and examined several likely candidates. This is strange territory indeed, but the solution that impressed me the most was Christopher Greaves' Indexer (see screenshot 1). Calling this a macro is rather like calling Blenheim Palace a dwelling: it just doesn't convey the majesty of the thing. I'm almost tempted to lapse into marketing-speak and call it a total indexing solution. It – rather cheekily, I thought – installs itself into your Office Startup folder, so it's always loaded. What you see is a new

Give me a break

Here's a puzzle that I've often wondered about. When typing in a long URL, file path or Registry entry, it would be nice to express a preference for where it breaks, should it do so – rather like an optional hyphen except that you don't want a hyphen to appear as people might think this is part of the string. Ideally the break would be at a delimiter such as a slash or backslash.

Now, if you look carefully in Word 2000's Insert, Symbol, Special Character list, right at the bottom are No-width optional break and No-width non-break. Just the job, one would think. But on my system they don't do a thing. Microsoft's Knowledge Base mentions that these are designed for use with Asian languages, but there are reports that they work with any language, but only under NT. Others still report that these work, but the wrong way round. One bright idea for getting round this comes from Patrick Heeson, which is to type in a space, select it and then set the character formatting to 'Condensed by...' a suitable width. This will create an 'invisible' space.

CONTACTS

Tim Nott welcomes your comments on the Word Processing column. Contact him via the PCW editorial office or email: wp@pcw.co.uk. Please do not send unsolicited file attachments.

Labour-saving formulae

Stephen Wells explains how to deal with 40 years worth of data – and measures up a garden

When I receive a query from a reader, I'm often tempted to suggest redesigning the application. I also have difficulty deciding between several ways of solving the problem. A typical example was sent to me by David M Smith, who said: 'I have to provide a financial analysis, for any given month end, of data logged monthly over periods of up to 40 years. My columns of analytical data, in an Excel spreadsheet, are derived from formulae that refer to the cell returns under the given monthly column. This necessitates laboriously changing the cells in every formula to reflect the required month's returns. I feel I ought to be able to insert the required report month end date in a cell which, in turn, can then be used to locate the appropriate column heading under which the corresponding cells could be automatically retrieved for insertion in the analytical formulae.'

Looking at the example he gave (within the message, not as an attachment, mercifully) it seemed to me it would be better to maintain the 40 years worth of data separately, on another worksheet, set up as a database. But without seeing the whole application it would be unwise to make such a recommendation.

Again, there are many ways of doing what David wants, but I suggested the following, as illustrated in screenshot 1.

Name the range AG16:AJ16, Search. This is a partial row of blank cells above the columns of data which we can use to insert an indicator of the column wanted. Name the range AG20:AJ28, Table. In this example, it is the range of the complete table of data.

David enters the required report month end date in cell C15. So enter this:
`=IF(AND(MONTH(AG18)=MONTH(C15),YEAR(AG18)=YEAR(C15)), "Here", 0)`

(Key: ✓ code string continues)

in cell AG16 and drag along the cells covered by Search.

This will insert the word, 'Here' above the column of data required.

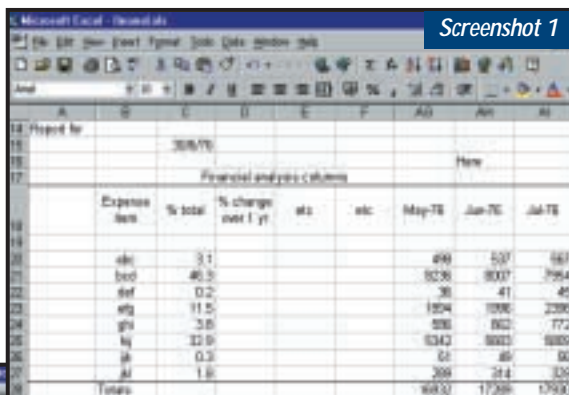
In cell C20 enter:
`=INDEX(Table, 1, (MATCH("Here", Search))) / INDEX(Table, 9, (MATCH("Here", Search))) * 100`

Cell C27 has:

`=INDEX(Table, 8, (MATCH("Here", Search))) / INDEX(Table, 9, (MATCH("Here", Search))) * 100`

For any date entered in cell C15, covered by the data, the correct percentages will now automatically be displayed.

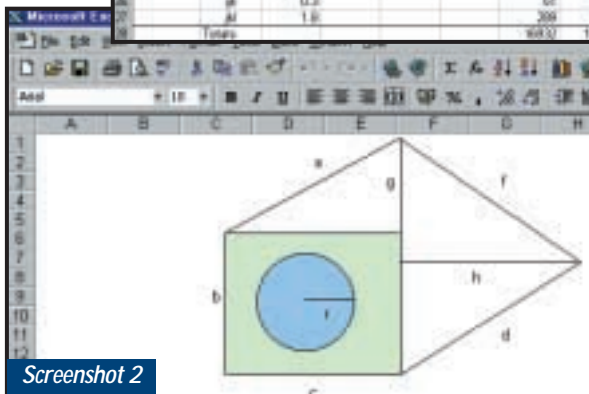
A few days after offering this solution I heard from David: 'Thank you for your wonderful advice. I pasted your formulae into one of my big spreadsheets and so far have got results in three long columns of reporting data. Your advice opened up my eyes to many other possibilities. Hope they work! I'm sure they will, David.'



Screenshot 1

Measuring up

Ruth Davis measured up part of her garden, transferred the detail to an Excel worksheet using the drawing tools, and sent me a printout (screenshot 2). 'I need to calculate how much turf to buy, as shown in the green rectangle, less the round pond. And to figure out the area of the rest of this shape which will be paved.'



Top: Excel can make calculations on the specific column of data you need when you have entered a date
 Bottom: Calculating areas of an odd-shaped part of a garden

Start with the rectangle. The area of that, whether in feet or metres is $=b * c$. If you enter the radius of the pond in cell B1 you can calculate its area by entering in another cell: $=PI() * B1^2$. The caret mark (^) is above the 6 key. Alternatively, using Insert, Name Define, you could name cell B1, Radius then enter in another cell $=PI() * (Radius^2)$.

The area of turf you need is the first calculation minus the second.

The area of the triangle above the green rectangle is $=(c/2) * g$. And the area of the large triangle to the right is $=(g+b)/2 * h$. It's all simple geometry and is quite logical because a triangle is half a rectangle.

`(MATCH("Here", Search))) * 100`

This means look for the column headed by the word Here and show the corresponding data as a percentage of the total of that column.

In each cell below add 1 to the figure after 'Table'. So in cell C21 enter:

`=INDEX(Table, 2, (MATCH("Here", Search))) / INDEX(Table, 9, (MATCH("Here", Search))) * 100`

CONTACTS

Stephen Wells welcomes your comments on the Spreadsheets column. Contact him via the PCW editorial office or email: spreadsheets@pcw.co.uk. Please do not send unsolicited file attachments.



The keys to Access

Mark Whitehorn demystifies primary and foreign keys and the importance of unique data

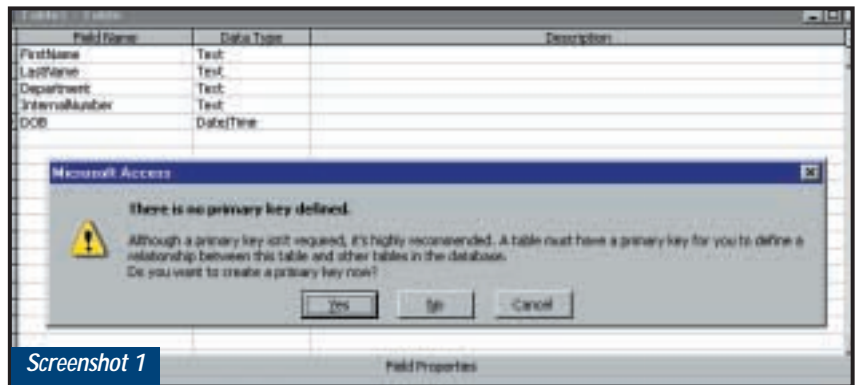
I've received several emails recently about primary keys, foreign keys, joins between tables and so on. For example, Keith Williams wrote: 'Access keeps on insisting that I put a primary key on each table I build. The only hint about why it wants it is that it is necessary for relationships. What's the real reason? Does Microsoft have shares in the sales of primary keys?'

In response, I would like to take an overall look at the entire process.

First and foremost, a primary key is one or more columns (or fields) in a table that contains values that uniquely identify each record. So, if we look at the People table in screenshot 2, we can try to guess which (if any) would make a good primary key. In fact, what we are looking for are called 'candidate' keys – fields or collection of fields that have the potential to be primary keys. So, what looks good? Well, in truth, nothing much. The FirstName field is clearly no use because there are only three records and already we have a duplicate. And, to no-one's surprise, the same is true for LastName. (OK, I admit choosing the data in order to illustrate the point).

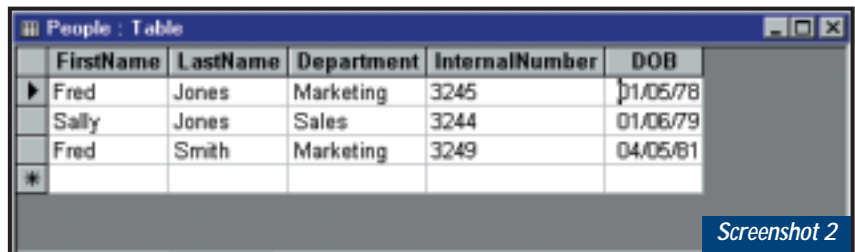
Both name fields taken together do uniquely identify each record (there is only one Sally Jones for example) but experience tells us that we can't be sure that this will always be the case. The same argument goes for date of birth (DOB). InternalNumber looks good, but what happens if some people don't have a phone number? We could argue that we could use all of the fields together as the primary key but, even so, we still might not be sure that we would always have a unique identifier.

In addition, trying to use all of these fields together as the primary key is going to get very messy, so a better idea is to use a value that we are sure will be unique (such as a National Insurance number) or to add a number that we know is unique for each person. If you make use of the Access data type called Auto-Number, you can be sure that each value will be unique for the simple reason that this is exactly what AutoNumber was designed to do in the first place.



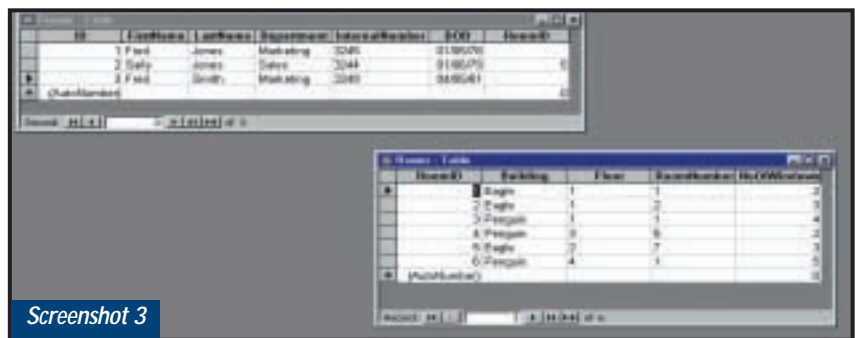
Screenshot 1

Microsoft Access being tedious about primary keys – or is it correct to be so pernickety?



Screenshot 2

A table bereft of the comfort afforded by a primary key



Screenshot 3

Making sure Sally ends up in the right room

We now have a unique identifier for each row (that is to say, record) in the table, but what I have totally failed to do is to tell you why you would want a unique identifier for each row (which is what Keith was asking in the first place). So, let's do that.

One of the central tenets of the relational database model is that we try to store information about an object (such as a person or a room) just once within the database. This has several advantages, for example it means

that we don't store lots of redundant information and also that, if we want to change someone's details, we only have to change them in one place.

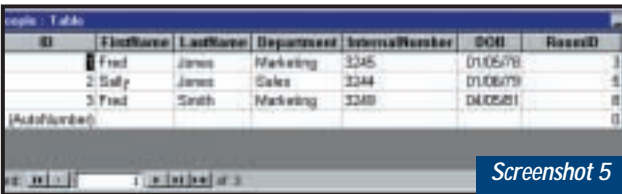
A consequence of this approach is that we typically have a table for each type of object – one for people, another for rooms in which they work, a third for the orders they process, a fourth for the objects that the company sells and so on.

So, when we want to record the fact that, say, Sally Jones works in room seven on floor two of the Eagle building, we



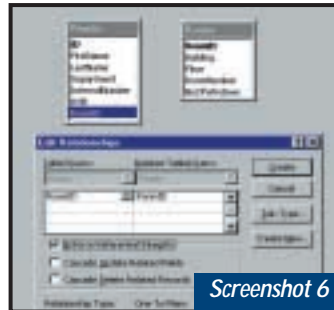
Screenshot 4

Sally is now in a confused state



Screenshot 5

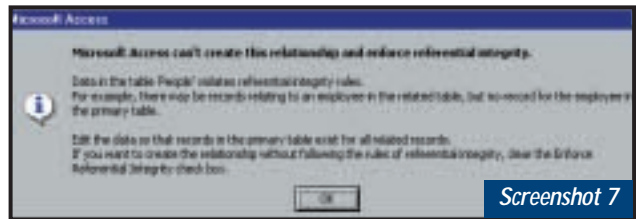
Sally is now OK, but where does Fred Smith work?



Screenshot 6

Left: Setting up the join

Below: Access won't even create the join if any of the existing data in the foreign key field is outside the acceptable range



Screenshot 7

simply add a field to the People table and store within it the primary key value for that room (see screenshot 3).

This is a great system, but as soon as you see it working, you can begin to see that it puts some inevitable restrictions on the properties of a primary key. For a start, if two or more rooms have the value 5 in RoomID then we suddenly don't know where Sally is supposed to be (screenshot 4). This explains why we are so concerned about each value of the primary key being unique. It is also a 'bad thing' if the primary key field contains null values.

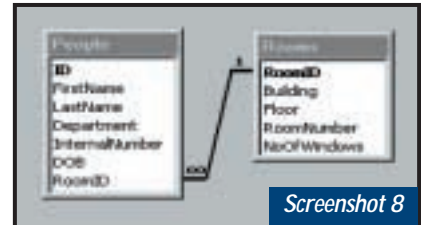
We can also think about some of the rules that need to be applied to the RoomID field in the People table. Any field like this one that 'points' to a primary key field in another table is called a foreign key field.

Clearly the values in the foreign key field have to be drawn from the existing pool of values that exist within the primary key field. If not, we get a

situation like that shown in screenshot 5 which is less than helpful.

How do we ensure that the values in the foreign key are correct? Well, it's a trick question in a way. We can't easily ensure that they are correct, because perhaps Sally has moved out of room 7, floor 2 of the Eagle building and forgotten to tell us. But we can ensure that the values in the foreign key are at least possible values. All we have to do is to tell Access that the two tables are 'joined' by the two fields concerned and it will, for ever after, keep tabs on the values that we put into the foreign key field. So, how do we do that?

Simple. In the relationship editor, you add the two tables, drag and drop between the two fields, select the Enforce Referential Integrity option (see screenshot 6) and *voilà!* It completely fails (see screenshot 7). At least, I hope it won't when you try, but it did for me because my tables contained the data shown in screenshot 5, some of which is



Screenshot 8

Once the data has been fixed, the join proceeds without any problems

meaningless. Access spotted the meaningless data and, quite rightly, refused to proceed. Once I fixed it, Access was happy to set up the join and thereafter look after the data (see screenshot 8).

This process of keeping the data in the foreign key field within acceptable limits is known as 'referential integrity' (RI). In fact, simply being able to tell the database engine to look after it for you (as we have just done) is known as declarative RI. Some of the older database engines don't support declarative RI and instead the job falls to the database programmer, who has to manually set up 'triggers' (see box left) that do the checking (this is known as procedural RI). In almost all cases declarative RI is preferred and many database engines support both methods.

Trigger happy

A trigger is a piece of code that can be attached to a table. The code runs when a certain action is performed – for example when a row is added to the table, or when another one is edited.

To enforce RI using a trigger you have to write

code that says, in effect: When a row is edited (or added), check that the value in the foreign key field is also found in the primary key field of table X.

Bear in mind that you need other triggers, for example one on table X

that says: When a primary key value is edited, check that the value being changed wasn't being referenced by any foreign key values in table Y.

These triggers can be complex, which is why declarative RI is often preferred.

CONTACTS

Mark Whitehorn welcomes your feedback on the Databases column. Contact him via the PCW editorial office or email: database@pcw.co.uk. Please do not send unsolicited file attachments.



Turn on and tune up

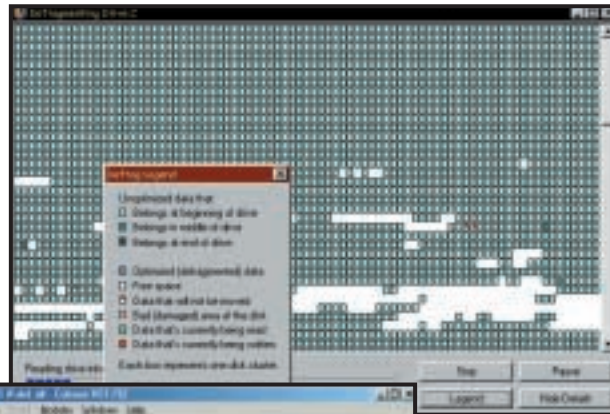
Ian Waugh takes you through various tweaks that will make your PC sing more sweetly

You might think that opening a 64MB Adobe Photoshop document in half a second is power computing or that recalculating your 36-page spreadsheet on the fly is heavy stuff. Pah! Nothing taxes your computer more – or shows up holes and bottlenecks in your system – than music.

Consider this: if there's a glitch when loading a graphic document, maybe it takes a fraction of a second longer to load, but if there's a glitch when playing a music file it'll stand out like a pretty girl in a Madonna look-a-like contest. So optimising a PC for music not only requires fast data transfers but should also ensure that the data is transferred uninterrupted without any glitches. So, let's whip out our tune-up toolkit and see how we can do this.

Playing and recording digital audio involves reading and writing audio data to and from a hard disk. The first requirement, therefore, is to ensure that your hard disk is working to the best of its ability. To do that you should defragment it before you start a new recording project or every week or so, depending on how much data you record and erase.

When you save data to a hard disk, the system tries to store it in one contiguous section. If you record several files and then delete one in the middle, this leaves a gap. The next time you save data, the system tries to fill that gap. If the data is larger than the gap, some of it will be stored on another part of the disk. Continuous saving and deleting creates lots of gaps which, in turn, leads to data



Left: Use Windows built-in defragger while you learn Norwegian

Below: Customise the def.all file that Cubase automatically loads when it launches



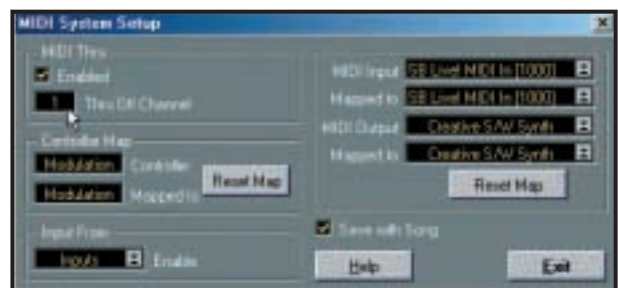
being split or fragmented across the hard disk.

This is particularly important when reading digital audio because the hard disk heads have to skip around all over the disk in order to retrieve a single file, which takes longer than if the data was in one continuous section. Defragmenting, sometimes called optimisation, reorganises each of the files so they are in one contiguous section. On seriously fragmented systems, defragging has been known to cure audio stutters at a stroke, but on any system it ensures the drive is working optimally.

Windows has a built-in defragger. Right-click on a disk drive icon in

Windows Explorer, select Properties, click on the Tools tab and there'll you'll see a Defragment Now button. Click on it and go read *War and Peace*. It works but it's slower than a Euro MP. Far better is to invest in a set of utilities such as Norton Utilities that includes a defragger. Norton is much faster and has more options.

Speaking of utilities, beware of those that monitor your system in the background. Windows' Scheduler does this, screensavers do it, running a network does it and some of the utilities in Norton do it. TSR (Terminate and Stay Resident) software as it is called interrupts the normal operation of your PC every so often, to check if it's time for it to kick into action. This steals some CPU power – in some cases this can be considerable – which can seriously impair the PC's ability to handle audio. Check for software in the Start>Programs>StartUp folder and check the Task Bar for software that may be running in the background.



MIDI Thru: In sequencers such as Cubase you can set a MIDI Thru Channel that will not be transmitted

RTFM. Yes, the suggestion you love to hate. But ignore the manual at your peril. It can save you hours of heartache, especially if you start tweaking sound card and sequencer settings. Read carefully the section about setting up the audio system because it is rarely straightforward. There may be a choice of drivers to use and there will invariably be settings that need to be tweaked in the sequencer's audio setup dialog. If you don't do this correctly, don't be surprised if it doesn't run as it should. The manual is often a good source of troubleshooting tips, too. And while you're at it, make sure you read any readme files that came either with the original program or with an update. It's amazing how much useful – and sometimes essential – stuff ends up here.

Okay, so you've set up your system and it's running smooth and fast like Jeremy Clarkson on Exlax. Here are a few suggestions to help you work more efficiently. First, create a customised song file that will load automatically each time you launch your sequencer. This is easily done in Cubase because it loads a default file called def.all. Change it to suit your way of working, perhaps with 16 audio and 16 MIDI tracks, with your preferred Transport Bar settings and so on, then save it.

If your sequencer doesn't load a default file, you can easily create one. You could even create separate files for different projects – one for General MIDI, one for audio only and one for score writing. Cakewalk goes one better. When you select New file, it offers a list of over 40 templates covering a vast range of project types.

Here's a thing about MIDI Thru. Most modern sequencers are designed so

It's far easier using the keyboard for Start and Stop than the mouse – honest!

that if you select a track and play an attached MIDI keyboard the incoming MIDI data is output on the channel of the selected track. This means you can set up MIDI channels and program numbers on the tracks themselves and play any of the sounds simply by selecting the track. You don't have to faff about changing the MIDI transmission channel on your keyboard. Neat huh?

Right: Logic's Key Command system lets you select your own hot keys for most functions.

Below: Before recording System Exclusive data, make sure the sequencer is not set to filter it out



However, there can be a problem if you use the sounds in the keyboard you're playing because they can sound twice – once when you physically play the keys and again when the MIDI data is echoed back to the keyboard through the sequencer. The easiest way to prevent this is to switch Local Control to Off on the keyboard. This function is normally hidden in a Utility menu and it disconnects the keys from the sounds so

channel 1, you'd set the Thru Off channel to 1 and all would be well.

If you want to be a power user, learn some hot key functions. If nothing else, learn the Start and Stop controls – it's far easier using the computer keyboard for this than the mouse – honest! Then learn the keystrokes for the commands you use most often, maybe opening various editors. Apart from anything else, you'll impress the heck out of your friends.

Finally, if you use external MIDI instruments, when the project is finished, transmit their settings as System Exclusive dumps to the sequencer and save them along with the song files. It keeps all the data for the project together and you'll love yourself forever if you have to go back to the project at a later date.

You record SysEx data just as you record any MIDI data, but be aware that some sequencers have a filter that defaults to ignoring SysEx data so make sure that's switched off before recording. A SysEx dump is triggered from the instrument itself – check the manual. It's usually very easy, simply a matter of selecting a menu option and then pressing a button, but start the sequencer recording first.

You've just painted go-faster stripes on your music PC – and they won't hurt its performance with other applications either. You'll also be the most organised musician on the block.

CONTACTS

Ian Waugh welcomes your comments on the Sound column. Contact him via the PCW editorial office or email: sound@pcw.co.uk. Please do not send unsolicited attachments.



Tools of the trade

Ken McMahon looks at the handy DTP tools that help bring order to the printed page

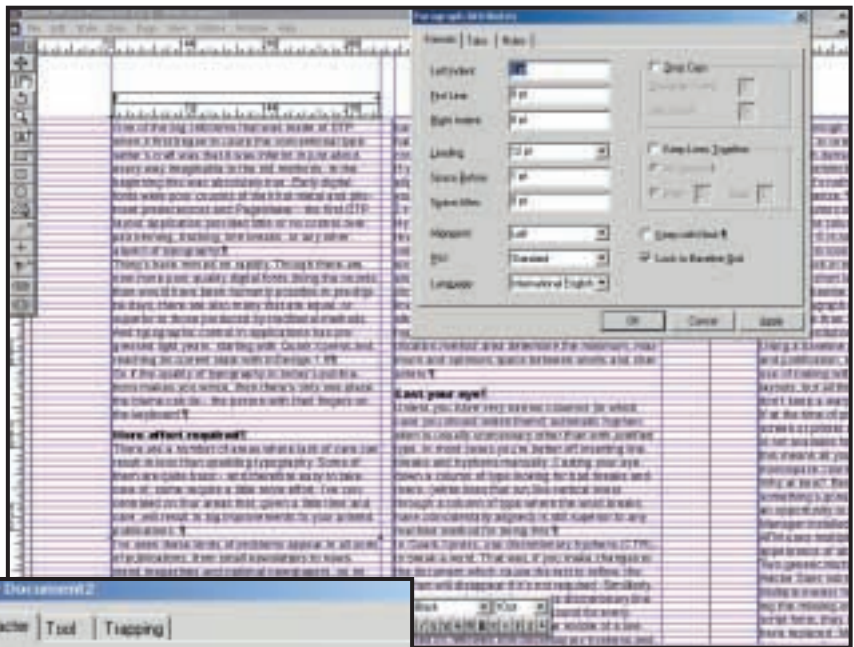
One of the big criticisms that was made of DTP when it first began to usurp the conventional typesetter's craft was that it was inferior in just about every way imaginable to the old methods. In the beginning this was absolutely true. Early digital fonts were poor cousins of their hot metal and photoset predecessors and PageMaker – the first DTP layout application – provided little or no control over pair kerning, tracking, line breaks, or any other aspect of typography.

Things have moved on rapidly. Though there are now more poor quality digital fonts doing the rounds than would have been humanly possible in pre-digital days, there are also many that are equal or superior, to those produced by traditional methods. And typographic control in applications has progressed light years, starting with Quark Xpress and reaching its current state with InDesign 1.5.

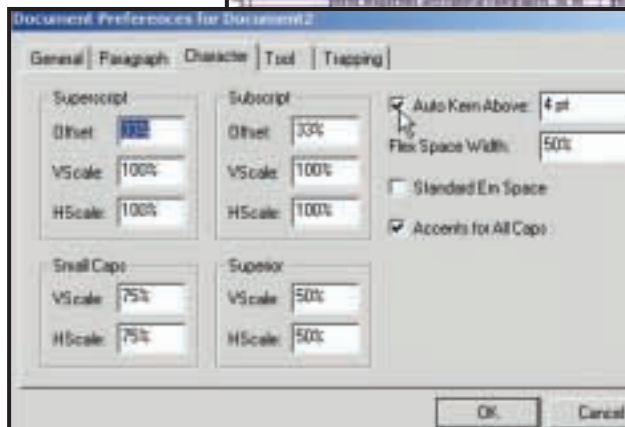
So, if the quality of typography in today's publications makes you wince, then there's only one place the blame can lie – the person with their fingers on the keyboard.

There are a number of areas where lack of care can result in less than sparkling typography. Some of them are quite basic – and therefore easy to take care of – while some require a little more effort. I've concentrated on four areas that, given a little time and care, will result in big improvements to your printed publications.

I've seen these kinds of problems appear in all sorts of publications, from small newsletters to newsstand magazines and national newspapers, so no-one is immune. The specific detail refers to Quark Xpress but, as always, the



Above: By setting your baseline grid to half the body copy leading, you can use half-line spaces before crossheads



Left: Set auto kerning in the character tab of document preferences

general principles can be applied to pretty well any good layout application, particularly those like InDesign, PageMaker and Ventura, that offer sophisticated typographic tools.

Baseline grids

Setting a baseline grid, and defining paragraph styles that lock to it, ensures that your type baselines will line up across columns and pages. It will also ensure (unless you're a long way out) that the tops and bottoms of your text columns align. Start the grid at the top page margin and set the increment to the body copy leading size.

One of the constraints that a baseline grid imposes is that you can't insert space before and after paragraphs that is

less than the baseline increment – the paragraph will simply lock down to the next baseline, effectively inserting a single line break. This will also happen for paragraph styles that are larger, or have more leading than the baseline increment – crossheads for example.

If you want to have space between paragraphs of less than a line, one way around it is to set the baseline increment to half the body copy leading. So, if your body copy is 9 on 10 point, setting the baseline increment to 5 point will allow you to have half a line break before or after paragraphs or crossheads. If you do this you will need to spend time manually aligning columns that are half a line over, or under, your bottom margin.

H&J (auto and manual)

Hyphenation and justification control where lines of text break to ensure that the words flow evenly, without ugly spaces at the end of lines and between

words. In Quark XPress, H&J uses a rule-based algorithm, combined with a hyphenation exceptions dictionary, to determine the best place to break a line. Factors like the number of letters before or after a hyphen, the smallest word, and the number of hyphens in a row can be defined. Values in the justification method area determine the minimum, maximum and optimum space between words and characters.

Unless you have very narrow columns (in which case you should widen them!) automatic hyphenation is usually unnecessary, other than with justified type. In most cases you're better off inserting line breaks and hyphens manually. Casting your eye down a column of type looking for bad breaks and rivers (white lines that run like vertical rivers through a column of type where the word breaks have coincidentally aligned) is still superior to any machine method.

In Quark Xpress, use discretionary hyphens (Ctrl & -) to break a word. That way, if you make changes to the document that cause the text to reflow, the hyphen will disappear if it's not required. Similarly, if you want to break a line, use a discretionary line break (Ctrl & Enter). If I had a pound for every hyphenated word or break in the middle



Spot the difference: the text on the left is tracked by -5, on the right +5

Tracking is the same thing applied to a block of text. PostScript and TrueTypeFonts have built-in kerning and tracking tables; you can apply these in Quark Xpress via the Character tab of the Document Preferences. It's not usually necessary to worry about kerning for body copy type, but for headlines and other display type you can make use of the kerning buttons on the measurements palette to adjust kerning in increments of 1/20th of an em (hold down Alt to kern in 1/200th of an em increments).

Tracking is done in exactly the same way with a highlighted text block selected. Tracking is a very useful copy-fitting tool; tracking a paragraph by -1 (that's 1/200th of an em) is almost

undetectable, but often it's enough to save a line. You do need to be careful not to overdo it though. If you track type in it looks much denser, track it out and it looks lighter. In layout terminology this is called 'colour', though of course it's nothing to do with colour in the conventional sense.

Ideally columns should look consistent in colour, so tracking one column in by, say -5 and an adjacent one out by 5 is not a good idea, unless you

want your page to look like a newly-mown lawn. If you need to track in to get copy to fit, pick a paragraph that has a short last line and track it in by no more than -3. Likewise if you need to take a line over, pick a paragraph with a long last line and track out by no more than 3.

Font substitution

Using a baseline grid, taking control of hyphenation and justification, kerning display type and judicious use of tracking will all contribute to improving your layouts, but all this hard work can

be undone if you don't keep a wary eye out for font substitution.

If at the time of printing the TrueType font, or either the screen or printer element of a Type 1-PostScript font, is not available then font substitution will occur. At best this means all your hard work will be replaced with monospace Courier. Why at best? Because at least it's very obvious something's gone wrong and, hopefully, you'll have an opportunity to correct it. If you have Adobe Type Manager installed it may not be so easy to spot. Adobe Type Manager uses multiple master fonts to mimic the appearance of absent fonts.

Two generic Multiple Master fonts, Adobe Serif and Adobe Sans, substitute for the missing fonts. While Multiple Master fonts can be quite good at replicating the missing original, often, for example with script fonts, they don't look anything like what they have replaced. More importantly, the priority for Multiple Master fonts is to maintain the same line breaks as in the original and they will adjust word and letter spacing to achieve this, so all of your tracking and kerning goes out of the window.

All this hard work can be undone if you don't keep an eye out for font substitution

of a line caused by reflowed non-discretionary hyphens and line breaks (usually in *The Guardian*), I'd have enough to see Tom Jones in concert with change to spare.

Pair kerning and tracking

Kerning is adjusting (usually reducing) the space between two characters to eliminate the visual gap that arises between certain letter pairs - AW and AV being typical examples.

CONTACTS

Ken McMahon welcomes your comments on the Graphics & DTP column. Contact him via the PCW editorial office, or email: graphics@pcw.co.uk. Please do not send unsolicited file attachments.



And on the seventh day...

Creating worlds is a tiring business for 3D gods, but Benjamin Woolley discovers some resources

3D graphics artists are gods. They create worlds. They are the prime movers in their own virtual realities. They are the legislators of their own laws of nature. But, before we allow this divine power to go to our heads, we should remember that world building is a demanding business. Even the Biblical God could only keep it up for six days before needing a rest.

The reason it is so exhausting is that a lot goes into building all but the most boring worlds. You need a lot of imagination, an immense understanding of the tools at your disposal, exceptional engineering skills, deep reserves of patience and passion, and a generous dash of inspiration. We sometimes forget this. Products like Bryce, Poser or the 'World Construction Toolkit' supplied with 3D Studio promise to conjure up worlds in a trice. Using a tool like Bryce, for example, you can build mountains in minutes, set them before a stunning sky, even in a silver sea. But the seductive glimmer of that first render will very quickly fade once you start to explore your terrain in any level of detail. Ridges and valleys, rocks and craters that from a distance appear interesting on closer inspection will turn out to be dull.

One piece of mountain will be indistinguishable from the next, one cliff or crevasse much like another.

So what do you do when you have not got the time or tool to add such detail? Most 3D packages are supplied with a library of models, textures and now even animation (including motion-capture) data to get you started. Some of this material can be of a high standard. Poser, for

example, comes with a good and, with each release, growing selection of characters and clothing for you to play with. But with every package the choice is limited.

For a more substantial source of such 'found' material you need access to an online database. The first of these was Avalon. This was set up as a place for 3D enthusiasts to exchange work and ideas. Viewpoint, (whose motto, 'Just 1K short of reality', is a masterpiece of corporate meaninglessness), acquired the name and database, but has since dropped the title, deciding to concentrate on more commercial ventures, the most significant of which is its 'Modelbank' (www.modelbank.viewpoint.com).

at prices ranging from \$20 (£14) for models with a low level of detail, comprising 2,000 or so polygons, to \$70 (£50) for complex models at very high levels of detail, with half a million polygons. For a hefty premium, you can also buy models without paying for membership. A highly detailed model of the Titanic (557,143 polygons), for example, was \$69 (£49) to members, \$344 (£246) to non-members. (One point to note about the Modelbank is that it is heavily skewed in favour of 3D Studio MAX users; other file formats are available, but the Titanic model for one was only available as a MAX or DXF file.)

TurboSquid (crazy name, not so crazy company) offers an alternative. It has

The seductive glimmer of that first render will quickly fade once you explore your terrain

The Modelbank offers nearly 5,000 models and lots of textures. For a fee of \$399 (approximately £285) you can become a member of the Modelbank, and download models ranging from ships to Spanish Ovines (a kind of sheep)

developed a program, a 'client application' that is designed to enable artists to buy and sell their own products or 'assets', such as 3D models, over the web. The first marketplace to be set up using this software is aimed at games



The Viewpoint Modelbank's splendid Titanic model (but no iceberg)

Screenshot 1



Screenshot 2

The home page of the Gamasutra Exchange, as displayed using the TurboSquid client software

developers: the Gamasutra Exchange (www.gamasutra.com/exchange/).

Gamasutra (www.gamasutra.com) is a useful site for games developers, and at the time of writing was offering on its home page links to such eye-catching articles as *Sex in Videogames* and less titillating but probably more useful guides such as *Refractive Texture mapping*. You need to log on to see the editorial material, but registration is both relatively quick and free, and provides access to some useful surveys of current game writing and development issues.

To access the Gamasutra Exchange, you first have to download the TurboSquid client software (2.3MB), install it and create an account. A home page pops up in the client window showing a list of the current most popular models, and a menu across the top includes three simple buttons: 'Member', 'Buy' and 'Sell'. The member button takes you to a screen for managing your account, and the buy button to a search utility that you can use to search the entire database for models or textures of a particular type. Once you find the 'asset' you want, you can click on it and a description window pops up, with information about the file's size, format, level of detail and price, some thumbnails showing what it looks like and a rating given by other users. If you decide to buy it, press a button marked 'acquire asset' and you're prompted for payment details, whereupon the file is automatically downloaded to your hard

disk. (There was, by the way, no information I could find in the help files on the security used to protect your card number, so you may want to check this before using the system yourself.)

When I looked, the choice of models was fairly limited, as you would expect so early in the exchange's development. Many, however, were free, and there was a variety available for just a few dollars. I cannot say that they were all that impressive, and some,

such as the model of a Porsche 911 which was featured in the 'Asset Spotlight' on the home page, were quite expensive at \$95.

Selling is, on the face of it, a simple process. You upload your files as a Zip archive, including a selection containing thumbnails of the model you are offering (if you are uploading a texture, the TurboSquid server automatically generates a thumbnail, just as long as the file is in jpeg format). Once uploaded, you describe the product (for example, assign the keywords used to search for it) and set a price. You then press a button marked 'Publish Asset' and within a few minutes it should be up on the system.

There is, of course, a cost: you get half the price for each purchase or download (in more conventional terms, a 50 per cent royalty). As a British citizen, you will also have to complete a form for an IRS 'Individual Taxpayer Identification Number' to get your money back

(otherwise you are liable to US income tax at 30 per cent). There are links to the appropriate US government websites in the TurboSquid helpfile and you can download the necessary form. One last consideration: at the time of writing, TurboSquid was paying royalties using cheques (or, rather, 'checks') in US dollars, presumably drawn from a US bank account, and complications may arise when you try to cash them in the UK.

Buying is a lot easier than selling over the Gamasutra Exchange, and one can only hope that, with time, the appearance of a lot of eager shoppers using the TurboSquid software will create a vigorous and vibrant market.

If so, it will become an extremely useful resource for buying the fiddly or difficult bits you need to create the worlds you want to build. There will obviously be a small cost, but it will be worth it if only so that you too can rest on the seventh day.



Screenshot 3

The description for a model of a female entitled 'Rachel', which gets the top five stars in the rating panel. A very detailed model but free to users of the Gamasutra Exchange

CONTACTS

Benjamin Woolley welcomes your comments on the 3D Graphics column. Contact him via the PCW editorial office or email: 3d@pcw.co.uk. Please do not send unsolicited file attachments.



Get sharp

Tim Anderson gets his head around Microsoft's new language and developing apps for .Net

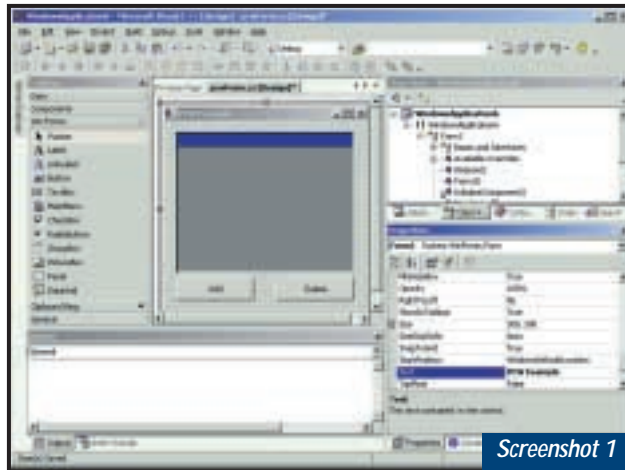
Microsoft's new language, C# (C Sharp), is likely to be the first choice for developing applications for the .Net Framework.

Although still in beta, the .Net SDK is available for free download, complete with command-line compilers for both C# and Visual Basic. As an aside, it seems likely that the compilers will remain free even after full release, since they are used by the new version of Active Server Pages, ASP.Net. If so, they would join a number of existing free compilers available for Windows, Linux, and other platforms; notably GNU C/C++, Borland C++, and Sun's Java SDK. While many C# developers will no doubt use Visual Studio, some will prefer to use other editors. Here we'll take a look at what a simple Windows application looks like in C#, from a pure code perspective.

Around 10 years ago Charles Petzold's book *Programming Windows* was the standard text for those learning how to write Windows applications. Jaws dropped when programmers saw the 60 or so lines of C code required to write 'Hello Windows', an application that simply displayed a window with some text in the middle. The problem with it was not only the amount of code, but its obscurity, beginning with the line:

```
Long FAR PASCAL _export WndProc (HWND, UINT, UINT, LONG);
```

This stuff is still there in Windows, although only a minority now write Petzold-style code. Microsoft Foundation Classes simplify coding by wrapping the lowest-level Windows code



Although most developers will use Visual Studio for C# development, it is not essential

in C++ classes. Delphi does the same trick with Object Pascal, while also providing a visual component library that lets you build an interface with drag-and-drop. Visual Basic is superficially similar, but whereas with Delphi you can burrow down to the Object Pascal source for most components, Visual Basic is less transparent. The .Net Framework changes the rules by providing a shared class library that any .Net language can use. This means that none of the true .Net languages will be bothering with WndProc, and there will be strong similarities in how different languages handle the fundamental plumbing of applications.

Figure 1 shows a C# application loosely equivalent to Petzold's Hello Windows. It begins with a using statement; this is a convenience that allows types in the System.Windows namespace to be used without qualification. In other words, instead of writing:

```
public class simple: System.Windows.Form
```

you can write:

```
public class simple: Form
```

The namespace concept is a way of avoiding name collisions. Different developers frequently use the same names for the types and variables they define. A namespace lets you give a unique qualification to these. For example:

```
namespace mynamespace
{
    public class Customer
    {
    }
}
```

Now you can refer to mynamespace.Customer without fear of ambiguity.

Assemblies

This raises the question of how C# libraries like System.Windows are packaged for re-use. In classic Windows, shared code can be compiled as a

FIG 1 Simple C# Windows app

```
using System.Windows;
public class simple: Form
{
    private Label mylabel;

    public simple()
    {
        mylabel = new Label();
        mylabel.Text = "Hello PCW";
        this.Controls.Add (this.mylabel);
        this.Text = "Welcome to C#";
    }

    public static void Main()
    {
        Application.Run(new simple());
    }
} (Key: ✓ code string continues)
```

C# is likely to be first choice for developing applications for the .Net Framework



Dynamic Link Library (DLL), or as COM DLLs, which export COM objects. The .Net solution is assemblies, which are classes compiled to Intermediate Language (IL). The description of an assembly in the .Net SDK goes like this: 'An assembly forms the fundamental unit of deployment, version control, re-use, activation scoping, and security permissions.'

A key feature is that, along with the classes themselves, an assembly also includes metadata that lists and describes its contents and dependencies. The .Net runtime can only execute code in assemblies, which may have a .exe, .dll or .mcl extension.

When you compile a C# application, the compiler needs to be told where to find the classes that you reference. You do this not only with Using, but also with command-line arguments. For example, if the code in Figure 1 is saved as SIMPLE.CS and you attempt to compile it with:

```
csc simple.cs
the compiler will raise a number of errors:
simple.cs(1,14): error ✓
CS0234: The type or ✓
namespace name 'WinForms' ✓
does not exist in the class ✓
or namespace 'System'
```

To resolve this, use the /reference: or /r: argument. This will do it:

```
csc /r:System.dll; ✓
System.Drawing.dll; ✓
System.WinForms.dll; ✓
Microsoft.Win32.Interop. ✓
dll simple.cs
```

Then you can compile without errors and produce simple.exe (screenshot 2).

Objects

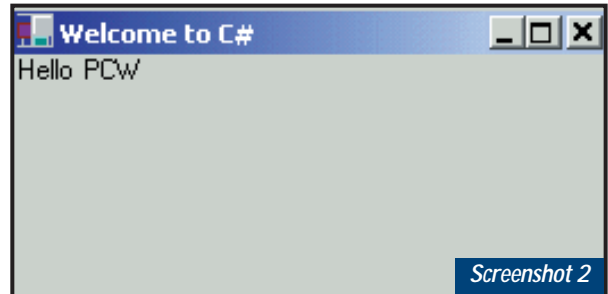
Everything in the .Net world is an object, or at least can be treated as such. You can see this even in the Figure 1 code. Aside from the using statement, all the code is within the public class simple that inherits from Form. We want some text to appear on the form, so a private object of type Label is declared. The simple class has a constructor, which you can identify because it is a public method with the same name as the class itself. This code creates a new mylabel object, sets its Text property, and calls the Add method of the form's Controls collection to add it to the form. The keyword 'this' is used to refer to the current instance of the object. Finally, to serve as the starting point for an application the class requires a public method called Main. This calls the Run

method of the Application object, which accepts an instance of the Form class as its argument and then displays the form. You cannot create an instance of Application, and its methods are static, which means they are called using the name of the class rather than through an instance.

The object orientation in C# is even more apparent if you add code to position the label on the form:

```
mylabel.Location = new ✓
System.Drawing.Point(50,50);
mylabel.Size = new ✓
System.Drawing.Size(100,50);
```

Here, the keyword 'new' is used for something as simple as setting co-ordinates. In fact, these objects are unusual. A Point is a struct type, which is only implicitly derived from the base Object class. It is an example of a value type, which means that when you assign it to a variable, its value is copied. By contrast, when you assign an object to a variable, you get a reference or pointer to



It may not look special, but this is a real .Net window

the object. Value types are more efficient when dealing with simple data that doesn't require the overhead of an object. Nevertheless, C# (and the .Net Framework) lets you treat value types as full object types, performing an operation called boxing, in effect automatically creating an object on the fly when it is needed. The idea is to get the best of both worlds, the performance of simple types along with the convenience of full object orientation.

The Visual Basic version

Figure 2 shows the Visual Basic version of the same application. It is very similar, and even more so after compilation to IL. There are no semi-colon statement terminators or curly brackets to mark blocks of code. Imports replaces using, and Me replaces this. The constructor is called Sub New(), replacing Initialise in VB 6.0. Inheritance is supported. Finally, instead of static VB uses shared. It is a shame that Microsoft has not made more effort to match the terminology. Even so, VB.Net is a full-featured .Net citizen, and while command-line compilation may seem archaic to some VB developers, others will be grateful for the freedom and flexibility it brings.

FIG 2

The VB version of Hello .Net

```
Imports System. ✓
WinForms

public class simple
inherits Form

private mylabel as Label

public Sub New()
MyBase.New
me.mylabel = new Label
me.mylabel.Text = ✓
"Hello PCW"
Me.Controls.Add ✓
(me.mylabel)
Me.Text = "Welcome to ✓
VB.Net"
End Sub

Shared Sub Main()
Application.Run(new ✓
simple)
End Sub

End class
```

CONTACTS

Tim Anderson welcomes your comments on the Visual Programming column. Contact him via the PCW editorial office or email: visual@pcw.co.uk. Please do not send unsolicited file attachments.

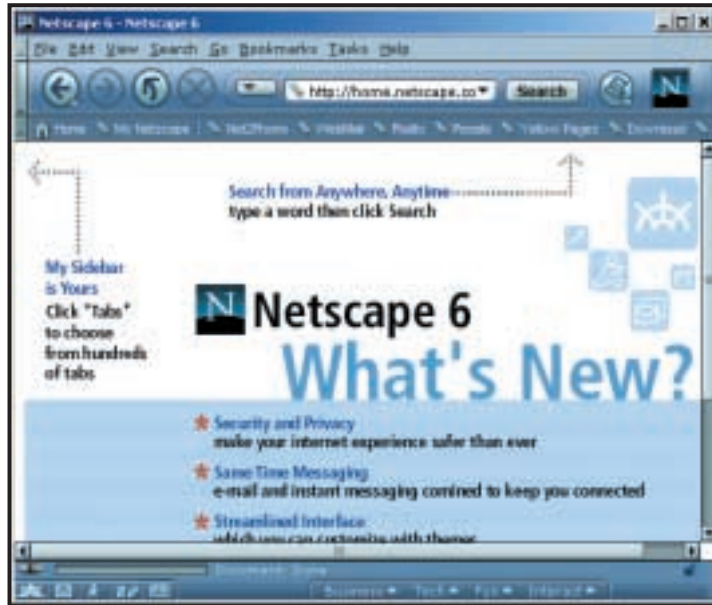
You can download the .Net Framework SDK from <http://msdn.microsoft.com/net>. Visual Studio.Net is also a public beta. You should not install this on a PC used for anything critical, although a spare partition with its own dedicated Windows installation will usually do.



Surveying the Netscape

Tim Anderson looks at why Netscape 6 is good news for web developers and how best to exploit it

Netscape 6, released at the end of 2000, has had a mixed reception. Typical web users, at least those who have bothered to try it, have given it the thumbs down because it is slower and less reliable than either Internet Explorer or the old Navigator 4.7. This reaction is understandable and it is interesting to note that while Netscape has determined that the Gecko engine is ready to release, the Mozilla project that is managing the code has not yet issued version 1.0. But these details distract from the real story, which is that Mozilla/Gecko/Netscape 6 is a brand new browser that supports a far richer set of web standards than its predecessor, and in some areas leap-frogs Internet Explorer. The key standards are the DOM (Document Object Model), Cascading Style Sheets (CSS), XML and RDF (Resource Description Framework). In every case, the Mozilla developers are serious about supporting the World Wide Web Consortium (W3C) standards, and failures are treated as bugs. Microsoft deserves credit for its work in supporting W3C standards in IE 4.x and 5.x, but at the same time seems willing to compromise, especially now



Netscape 6 has finally made it to full release. It may not be as good as IE, but it is just as significant

that IE has a dominant market share. The one thing that is likely to promote standards compliance in IE is a successful Netscape 6, so it is in everyone's interest for it to gain at least significant market share. Even if these issues do not bother you, Netscape 6 matters to any web developer who wants to keep broad compatibility, particularly bearing in mind that for most non-Windows users Internet Explorer is not available, and where it is, it doesn't always render pages identically to the Windows version. Much JavaScript code

that ran fine in Navigator 4.x will not run in 6, mainly because of changes to the DOM. Netscape marched up a lengthy blind alley with the version 4.0 DOM. At the time, either the company was convinced that it could pull the market along with it, or else it guessed wrongly about which way the W3C would jump. The most powerful DHTML features in Navigator 4.0 are based on the

<layer> tag, which lets you build up pages on separate vertically stacked transparent layers in a similar manner to many graphics packages. In Netscape 6, <layer> is gone completely. It is not even retained for backward compatibility. Other vanished elements are <ilayer>, <multicol>, and JavaScript style sheets. Since it is almost impossible to avoid <layer> when using Netscape 4.x DHTML, the chances are that your old DHTML scripts will no longer work. Fortunately, image objects do still have an src attribute, so code for rollover

FIG 1 Writing to innerHTML

```
<html>
<head>
<title>Dynamic Text ✓
Example</title>
<script>
<!--
function SetText(what) {
//does not work in Nav 4
if (what == 0) sText = "
else
```

```
sText = "<h3 id='new
heading'>Banana</h3><p
id='newtext'>Curvy yellow
fruit</p>";
thiselement =
document.getElementById
("dynamictext");
thiselement.innerHTML =
sText;
}
// -->
```

```
</script>
</head>
<body>
</img>
<div id="dynamictext">
<p>Original Text</p></div>
</body>
</html> (Key: ✓ code string continues)
```

FIG 2 Using appendChild

```
<html>

<head>
<title>AddChild and
RemoveChild Example</title>
<script>
<!--

function AddElement() {
DelElement();
headingobj = document.
createElement("h3");
paraobj = document.
createElement("p");
textobj = document.
createElement("Lemon");

//set ids
headingobj.id = "newheading";
paraobj.id = "newpara";

//set text
headingobj.appendChild
(textobj);
```

```
textobj = document.
createElement("Sharp
citrus fruit");
paraobj.appendChild
(textobj);

//add to document
thiselement =
document.getElementById
("dynamictext");

thiselement.appendChild
(headingobj);
thiselement.appendChild
(paraobj);
}

function DelElement() {
//Delete the dynamic
elements if they exist
thiselement = document.get
ElementById("newheading");
if (thiselement)
thiselement.parentNode.
removeChild(thiselement);
```

```
thiselement = document.
getElementById("newpara");
if (thiselement)
thiselement.parentNode.
removeChild(thiselement);
}

// -->
</script>
</head>

<body>
<img border="0" src=
"workshop/lemon.gif"
width="100" height="100"
onmouseover="AddElement()"
onmouseout="DelElement()"
></img>
<div id="dynamictext"><p
id="newpara">Original
Text</p></div>
</body>
</html>
```

images will probably continue to run.

As an example, I noticed several of my own scripts failing with Netscape 6. One of them animates a logo by showing and hiding images in table cells, and also features rollover images that dynamically replace a line of help text in response to the onMouseOver event. The first problem was in the browser detection. The existing code was:

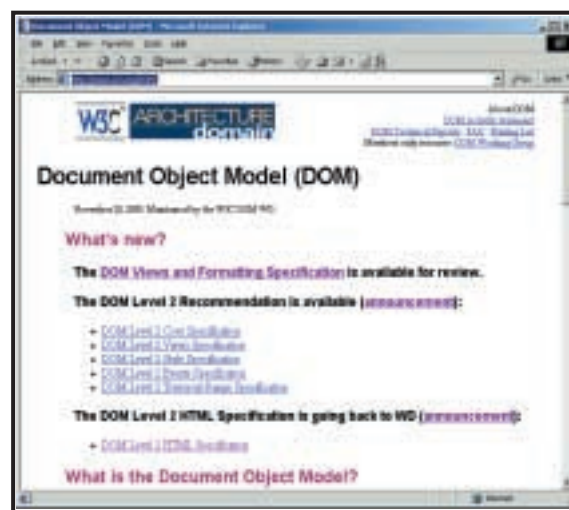
```
var sApp = navigator.appName;
if (navigator.appVersion.
substring(0,1) >=4) {
if (sApp.indexOf
("Netscape")>=0) isNav4 =
true;
if (sApp.indexOf
("Microsoft Internet
Explorer")>=0) isIE4 = true;
}
```

(Key: ✓ code string continues)

This is nice and simple, but makes the rash assumption that it's OK for Netscape 6 to be detected as Navigator 4. Developers must get into the habit of detecting Navigator 4 as a special case. As a quick fix, I modified the code to treat Navigator 6 as compatible with IE 4. Then I used a tip from Danny Goodman's online article on the W3C DOM:

```
var sApp = navigator.appName;
if (navigator.

```



The W3C website is the place to go for official reference information on the standard DOM

```
appVersion.substring(0,1)
>=5) {
if (sApp.indexOf
("Netscape")>=0) {
isNav6 = true;
document.all = document.
getElementsByTagName(" ");
}
}
```

The document.all collection is a handy array of all the elements in a document, no matter how deeply nested. It does not exist in any version of Netscape Navigator, so it is often used as a quick way to identify IE. In Netscape 6,

getElementsByTagName(*) retrieves all elements into a similar array, in effect duplicating the IE collection. In my case, these two changes were sufficient to get everything working. Note that in Netscape 6, navigator.appVersion returns 5, proving that developers count better than marketing departments. It is also now called Netscape unlike earlier releases, which were called Navigator, to reflect the shorthand that most people used anyway.

The innerHTML controversy
In Internet Explorer, a common



FIG 3 The power of display

```
<html>
<head>
<title>Expanding text ✓
example</title>
<style type="text/css">
h3.header {cursor:pointer;}
p {width:350pt;}
</style>
<script>
<!--
//won't work on NN4, add ✓
browser detection code
window.onload = hideall;

function ✓
Toggle(theheading,what) {

switch(what) {
case 1: sID = "one";
break;
case 2: sID = "two";
break;
case 3: sID = "three";
break;
case 4: sID = "four";
}

obj = document.✓
getElementById(sID);

if (obj) {
```

```
sHeading = ✓
theheading.innerHTML;
if (obj.style.display == ✓
'none') {
obj.style.display = 'block';
sHeading = "-" + sHeading.✓
substring(1,sHeading.✓
length);
} else {
obj.style.display = 'none';
sHeading = "+" + ✓
sHeading.substring(1,✓
sHeading.length);
}
theheading.innerHTML = ✓
sHeading;
}

function hideall() {

obj = document.getElement✓
ById("one");
if (obj) obj.style.✓
display = 'none';

obj = document.get✓
ElementById("two");
if (obj) obj.style.display ✓
= 'none';

obj = document.get✓
```

```
ElementById("three");
if (obj) obj.style.display ✓
= 'none';

obj = document.get✓
ElementById("four");
if (obj) obj.style.display ✓
= 'none';
}
// -->
</script>
</head>
<body>
<h3>Expanding headings</h3>
<hr/>
<h3 class="header" ✓
onclick="Toggle(this,1)">+✓
What is the DOM</h3>
<p id="one">Some text</p>
<h3 class="header" ✓
onclick="Toggle(this,2)">+✓
Standards compliance</h3>
<p id="two">some text</p>
<h3 class="header" ✓
onclick="Toggle(this,3)">+✓
Javascript</h3>
<p id="three">Some text</p>
<h3 class="header" ✓
onclick="Toggle(this,4)">+✓
DHTML</h3>
<p id="four">Some text</p>
</body>
```

technique for adding text dynamically is to use the innerHTML property of a DOM element. There are in fact four associated properties:

innerHTML
innerText
outerHTML
outerText

Writing to innerHTML changes the content between the two tags that enclose the object and asks the browser to render it by interpreting any tags within the content you supply. Writing to outerHTML is similar, except that the enclosing tags get zapped along with their content. Writing to innerText or outerText replaces the content but does not ask the browser to interpret any tags. Figure 1 shows an example, using document.getElementById to get a reference to a div object and then innerHTML to set its contents.

This works well but it is not the W3C-approved way to go about it. The reason is that it runs counter to the object

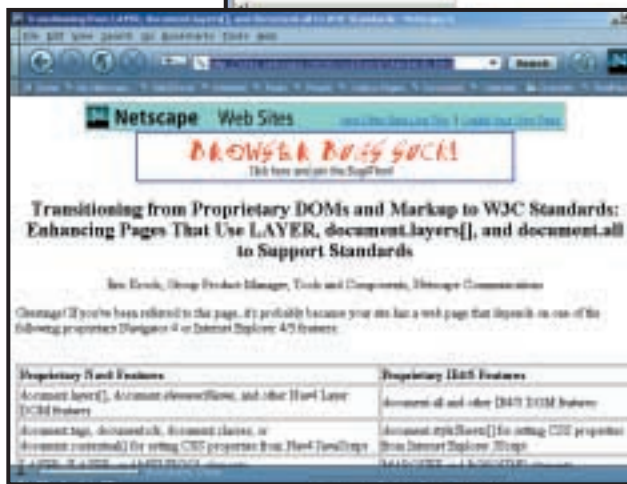
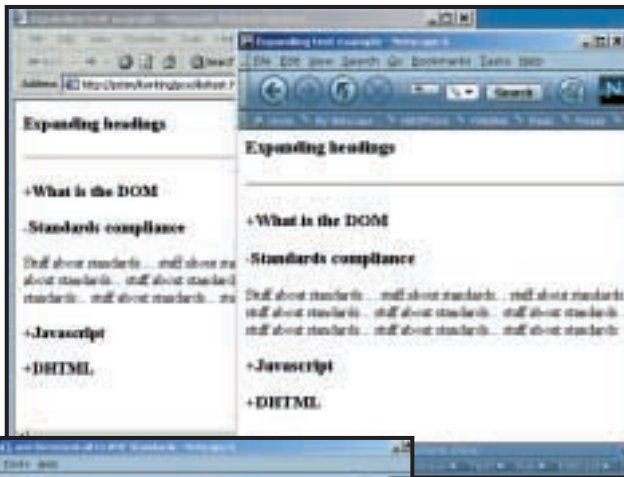
model. When you set innerHTML, you might be adding or deleting objects, or providing content that cannot be correctly parsed, or simply setting some text. The correct way to add and delete objects is through the object hierarchy. If you currently think of an HTML page as being similar to a word processor document, this might not make much sense. Instead, you need to develop an XML mindset in which the document is a tree with branches and sub-branches, similar to the view of your hard disk presented by Windows Explorer. The top level is the <html> element, and it has zero or more elements nested within it. These are child elements of <html>. In addition, each child element has zero or more of its own children, and so on through the tree. A document that conforms to these rules is known as well-formed, and as web standards mature it'll be increasingly necessary for web pages to follow the rules, for example by always using both opening and closing tags.

Here then is another way to add and remove text dynamically. Instead of setting innerHTML, create a new object of the desired type and slot it into the document tree with appendChild. Figure 2 shows an example that is functionally equivalent to Figure 1. The key steps are:

- 1) Create a new element with document.createElement("TAG"), where TAG represents the required tagname.
- 2) Give the new element an ID by setting obj.id.
- 3) Create a new text object with document.createTextNode("Text"), where Text represents the required string.
- 4) Find the parent object using document.getElementById and call its appendChild method, passing the new object as an argument.

A potential problem with this is that if you call the code repeatedly, you will append more and more text. There are several ways round this, either using replaceChild when the object already exists, or deleting earlier instances as in

Right: This page includes expanding headings and runs on both IE and Netscape 6



Left: Some reference material can be found on Netscape's developer pages

the example given. Although this is a purer approach, the code is three times longer than its innerHTML equivalent.

It could be simplified by creating some helper functions, but developers were so concerned about the extra work involved that they persuaded Mozilla to support innerHTML as a convenience.

With version 6 of Netscape the two object models are now far more similar than before

This is the one exception to its otherwise unyielding refusal to include IE-specific tags that are not part of the W3C DOM standard.

Cross-browser pages

Internet Explorer and Netscape will always be different, but with version 6 the two object models are now far more similar than before. That means building cross-browser pages is now realistic, unless you are on a Windows intranet and want to use features like ActiveX controls or other Windows-specific extensions in

IE. Testing code so that it works in both Netscape 6 and IE is well worth the effort. For example, IE 5.x lets you show and hide elements dynamically, so you can create click-to-expand headings. This is done by setting the display property of an element's style to 'none' to hide it, or another value to show it.

The power of display is that the document will reflow, unlike the otherwise similar visibility property. Figure 3 shows some simple code. There are two functions, `hideall` which collapses all the blocks, and `toggle` which switches a block between hidden or displayed. When the page loads, it is normally convenient to have all the blocks hidden, so the `hideall` function is called when the window.onload event fires.

It is important to give the user a visual clue that text can be expanded or

collapsed. In this example, the innerHTML property for each heading is retrieved in the toggle function. Using JavaScript's string handling methods, the code adds a plus or minus sign to the beginning of the heading to indicate that clicking on the heading will reveal or hide the block below it. To achieve an even better result, use a suitable image. Another small clue is created by setting the cursor (mouse icon) property of the heading style to 'pointer', rather than the default text insertion bar. There is a compatibility issue here, since IE recognises 'hand' but not 'pointer', and Netscape 6 vice versa.

You can overcome this with browser detection code, which is needed anyway since this example will definitely not run in Navigator 4.x or earlier. Aside from this small issue, the identical code runs in both IE and Netscape, giving the same results, and that is why Netscape 6 is a landmark release despite early quality problems.

CONTACTS

Tim Anderson welcomes your comments on the Web Development column. Contact him via the PCW editorial office or email: webdev@pcw.co.uk. Please do not send unsolicited file attachments. Examples from this column are posted at www.itwritting.com/pcw/.

RESOURCES

Finding documentation for the W3C DOM is not that easy. There is a mish-mash of resources at Netscape's site, or the authoritative but dry and difficult references at www.w3.org/DOM.

<http://sites.netscape.net/ekrockhome/standards.html>

A useful summary of what's changed with workaround tips

http://developer.netscape.com/viewsource/goodman_cross/goodman_cross.htm

An introduction to the W3C DOM by Danny Goodman. Danny is the author of *Dynamic HTML – The Definitive Reference* (O'Reilly, ISBN 1-56592-494-0, £29.95). This book is a couple of years old and a bit out of date, but even so it is a near-essential reference for serious work with DHTML. Netscape's newsgroups, found on the secnews.netscape.com news server, are a great place to get help with version 6 DOM queries.



Boosting online revenue

Nigel Whitfield identifies ways to maximise your income from both shoppers and advertisers

By the time you read this column, the jingling of Christmas cash register bells should be a distant memory. What's unlikely to be a memory, however, is the hype and, almost as certain, the disappointment surrounding online sales for the holiday season.

AOL has been one of the cheerleaders, hoping that its recent introduction of flat-rate packages will encourage people to spend more online. Of course, there are other services offering a flat-rate option, and some of those, like Freeserve, have their own shopping links too. Freeserve has always said that sales and advertising on its portal site would form part of the revenue stream that enabled it to offer a free service; it's tempting for other people to think that they can do the same thing, but Freeserve has two things in its favour. First is the sheer number of subscribers, and second is the backing of the Dixons group. Both can work to ensure that a fair number of people do actually see adverts, or buy products, from a default home page.

But how many people do you know who leave their home page set to their ISP? Many seasoned net users will change the default setting and use something different instead, making it much harder to come up with credible figures that would enable you to sell advertising, or rely on income from shopping.

When it comes to both, AOL has a great advantage. Since you have to use the AOL software, you don't have any choice but to see the adverts that the company decides to display to you – and the pop-up 'special offers' that give you the chance of buying and having goods added direct to your AOL bill.

Even with advantages like those, your online shop can still run into problems. As the BBC's *Watchdog* programme has pointed out, even some big names had problems in the run-up to Christmas, with Woolworths failing to meet its promised three-day delivery schedule for some customers.

If even the big companies have



The sample shopping basket script at www.nigelwhitfield.com also shows how you can set cookies in a user's browser

problems, does that mean you have to accept the odd glitch? Hopefully not. Ecommerce can be a great idea, but for many people, one of the best things about shopping in the real world is having the goods right away. For online or telephone shopping to work, people have to be prepared to accept some delay – but it needs to be reasonable and not prone to problems. And that means planning the fulfilment part of your ecommerce system – getting the product to the buyer – just as carefully as all the other parts. You might have a slick website, or an expensive TV advertising campaign, but if you can't deliver in a timely manner, you're unlikely to win repeat business – especially if you fail to get people their presents on time.

Looking at how you organise the shipping and delivery of goods isn't really within the scope of this column, but consider it a timely reminder; you may have read the hints and tips on how to manage some of your ecommerce, but you still need to pay attention to the offline side of the business too.

Now, let's get back to one of the other things we touched on earlier; the advantages that the likes of Freeserve and AOL have. In the case of both of these, their main business is being an ISP, with shopping and advertising being incidental – though helping to produce revenue that can keep the ISP costs down.

If you're reading this column, chances are that you're interested in setting up a shop, not an ISP, so what does this have to do with you?

Selling online doesn't mean you can't think of other ways to make money from your site. There's no reason, for example, why you can't have advertisements on your site, provided that they're not going to conflict with your own business. There may be complementary businesses and services, or simply others that you think are worth promoting. So, why not use advertising? If you can make more money, then perhaps you can keep the costs of your product down, or invest in faster fulfilment.

However, one of the biggest problems for selling adverts is knowing how many



hands on

ecommerce

people are looking at your site. We've looked at that issue before, and a recent survey by PriceWaterhouseCoopers found that all the sites it looked at were measuring numbers inaccurately. If you expect people to pay for an advert on your site, then you need to be able to say how many are really looking at it.

There are many different ways that you can track people through your site; a couple a months ago I explained this using the http referrer information. An alternative is to ask people to create an account with your online shop, storing details such as name and address, to make repeat orders easier.

If you do that, however, don't forget that you'll have to make sure you keep the data safe, and that you're properly registered with the Data Protection Registrar. And you should certainly avoid the pitfalls of some ecommerce sites that won't even let people find out if they sell a particular product, or discover a phone number, without creating an account and signing in.

Another way – and something you can use in conjunction with other tools – is cookies. Again, some users won't like that, and it's a good idea to ensure that the minimum amount of information is stored in cookies – and just use a session cookie rather than a permanent one.

The simple shopping basket system that I described two months ago uses session cookies to track users round the site, and if your pages are created by a script, it's very simple to implement them. For example, to set a session cookie called visitorID to 779, for pages with URLs beginning www.nigelwhitfield.com/work, you'd need a line like this in the http response:

```
Set-Cookie: visitorID=779;
PATH=/work; DOMAIN=
www.nigelwhitfield.com
```

(Key: *code string continues*)

The cookie will remain available until the browser is closed – so if someone surfs to another site, and then returns later, but without closing down the browser, you'd see the same cookie appearing.

You could arguably call this a different visit however, especially if you wanted, for instance, to automatically empty a shopping basket if it's more than a certain time since the cookie was created.

The shopping script (which you can find at www.nigelwhitfield.com) uses a



Left: Commission Junction is a good place to start finding out about other ways to boost the revenue from your site

bit of Perl to set a variable called `#{'orderid'}` to the time, followed by a full stop, and then the process number, where the time is the standard Unix time in seconds since 1970:

```
#{'orderid'} =
time . ' . ' . $$ ;
```

That should give you a unique id for the specific session, but what do you do when you want to see how long ago that session was created? Here's a bit of code that will do the trick for you, if you've got the cookie back into the same variable:

```
$expires = 30 ; # expiry
time in minutes
$now = time ;

( $start-time, $proc-id )
= split( /\./ , #{'orderid'} ) ;

if ( $now > ( $start-time +
( 60 * $expires ) ) ) {

# handle a timed out
session here

} else {

# continue as normal here
}
```

Of course, that simple logic just tracks the time since the cookie was set – if you want to track when someone last looked at a page from your site, you'll need to reset the cookie for each page.

You can see the code for the rest of the simple shopping basket, including



Below: Crimebookshop.com is a business based solely on commission

how to read and set cookies, on my website at www.nigelwhitfield.com.

An alternative to advertising on your site is to join an affiliate marketing scheme, such as that run by Amazon. This means you can recommend useful books to your clients, and receive a commission whenever anyone follows the links from your site to buy them. Once the links are set up, you don't have to do anything else – you wait for people to buy, and leave fulfilling the book orders to Amazon. In fact, some people have set up their own stores that rely solely on such a system, rather than selling anything themselves. One such example is the Crime Bookshop, at www.crimebookshop.com.

For other ways of boosting income from your site, Commission Junction, at www.cj.com, is also worth a look.

CONTACTS

Nigel Whitfield welcomes your comments on the Ecommerce column. Contact him via the PCW editorial office or email: ecommerce@pcw.co.uk. Please do not send unsolicited file attachments.



Bluetooth is the new WAP

Is the future of connectivity all it's cracked up to be? Simon Rockman weighs up the options

For months Bluetooth has been hailed as the way your fridge will talk to your microwave and the future of connectivity. Everything will have a Bluetooth chip in it. Now products are starting to ship, the reality of chip production is starting to come home to roost. The chips are bigger, more power hungry and far too expensive to be a casual inclusion in a product. It's way more complicated than infra-red. So Ericsson's Bluetooth headset is £199, GN Netcom's headset and fixed-line phone £350 and the Nokia combination of a Bluetooth battery for a 6210 phone and PC Card is awaiting a price.

The backlash has started – Comdex saw lots of other wireless solutions – and just as WAP garnered a reputation for being over-hyped, so Bluetooth will follow. This time next year, once the chips reach volume production, the price and power requirements will come down and Bluetooth will live up to its promise.

The time has arrived where mobile data has stopped being a solution looking for a problem, and become something that people use routinely. What's interesting is that there is no 'killer app'. Ever since Visicalc 'made' Apple, the traditional thinking has been that each new platform has needed a software package as a reason for being. The thing about mobile data is that the services people use are just the same as those they use when fixed. There has been some downgrading, due to smaller screens and lower bandwidth, but the services used are still principally email and messaging.

People need their email fix three times a day – spend a few hours away and you get twitchy

Nigel Dutton from BT Cellnet is keen to tell you that people need their email fix three times a day – spend more than a few hours away from your messages and you get twitchy. Mobile email is the solution to this.



Trium's Mars phone includes WAP

It has become so much an ingrained part of the mobile phone culture that some kind of mobile data is becoming standard in phones. It's actually cheaper to have a phone with mobile data than without. A phone costs between \$90 (£57) and \$200 to make. This translates to a retail price of somewhere around

£200 by the time you've taken in the costs of marketing, service, sales support and freight. The dealer gets around £150 from the network for selling the phone and so can sell it to you for £50. In practice the dealer tends to buy a phone

with a contract from one of the networks. Something like 70 per cent of all phones sold by manufacturers go not to the wholesalers and dealers but to the networks. The network then sells them on to the dealer for less than they paid, so as to subsidise the contract. In the early days of the mobile phone this had the added bonus of confusing the hell out of the VAT man.

What's not often realised is that different phones attract different subsidies. What makes the mobile phone world go around is how much you use a phone. People who use WAP tend to spend about 20 per cent more than those who don't. That's between £50 and £100 a year. It costs a lot less than that to put WAP into a phone. This explains why some new cheap phones like the trendy Ericsson T20 and the amazingly capable Trium Mars have WAP. The Ericsson sells for about £20 with a contract and the Mars for about £40 on pre-pay. It's a topsy-turvy world where the less you pay, the more the phone does. This is balanced by the more you pay, the smaller the phone is. Ultimately, what matters isn't how many features there are, or how small the phone is, but the density of gadgets. Both the Trium and the Ericsson do well on this measure.

One new entrant who also does well is Sendō, which makes it the lightest phone around, the 68g D800. It includes an infra-red modem which will do 14,400bits/sec data – although only on Orange and then only if you pay an extra £5 a month. A Sendō and a Palm V or Psion Revo make a great combination for mobile mail.

One of the limiting factors with mobile phones is entering messages. If you want something small enough to go in your pocket, it's going to be difficult to type on. Palm and Handspring have the great option of a roll-up keyboard like the Targus Stowaway (<http://hs.widget.co.uk/stowaway.htm>). Another approach is to type text using the phone keypad. This has led to the language of the playground such as CU I8er (see you later). Great fun, but for more sensible text the main option is Tegic's T9



Sendo's D800, weighs in at only 68g

predictive text input. This looks at what you are typing and works out what words you want by just using the first letter on each key of the numeric keypad. This is fine if the word is in the dictionary. Tegic has an agreement with pretty much every mobile phone manufacturer bar Alcatel, and Motorola has gone so far as to develop its own rival system. T9 is great for most purposes but some things – particularly the URLs you type into a WAP phone – are not going to be in the dictionary. A new pretender to T9's throne that solves this (at the cost of more keystrokes for normal words) is Eatoni (www.eatoni.com). As you type a word it guesses what letter you want but if it guesses wrong you correct it. As a



Eatoni's mobile phone 'guesses' words from the letters initially typed in

result it then has a better chance of getting the subsequent letter right. This means that it's possible to successfully type nonsense and compound phrases like lastminute.com that T9 would have trouble with. Eatoni claims that it offers a better solution than Tegic. Very often, however, these things are not a matter of having the best solution, but of being the best at selling the product. Nowhere is this clearer than in the battle between Microsoft and Symbian.

Most mobile phone manufacturers have smart phones on their roadmap. In terms of market share Symbian is unassailable, with Nokia, Ericsson and Motorola all being Symbian licensees. Microsoft is working hard to mop up the small players and this has led to another topsy-turvy approach. Traditionally, if you make a product and want to include a third-party application, you pay for the software. There are rumours that Microsoft is prepared to pay handset manufacturers to use Microsoft software. This is shrouded in non-disclosure agreements and it's hard to get anything concrete. While Microsoft was once happy to give details of trade pricing they now no longer discuss these issues.

For the mobile phone manufacturer there are more issues than just the price of the software. Microsoft understands customer support better than Symbian, while Symbian understands mobile phones better. From a handset manufacturer's perspective, the burden on customer services in shipping a Microsoft-based phone will be very much greater than those incurred in shipping a Symbian one, but then they will be better able to cope with the problems. I've been playing with a Compaq iPaq and an Ericsson R380. There has never been any need to reset the Ericsson (I don't even know how to do it) while the Compaq needs a reset most times I use it. In any

given week with a CE device I hit reset more often than I have ever done in 10 years of using Psion/Epoc/Symbian products. CE devices are like a PC – you expect them to crash occasionally. Unfortunately, with the Compaq it often means a hard reset, losing all my data and re-installing drivers.

More telling is that Microsoft has been road-showing the latest Sagem WA3050, a PDA/phone that runs Pocket PC, and the Compaq iPaq with a cellular modem. On the surface, here is a device that runs Microsoft software in a mobile phone; look more closely and you discover that the mobile phone bits are not Microsoft's. The drivers for the cardphone come from TBS in Derby, the software for sending SMS or fax messages comes from the French company GVRP. The bottom line is that if you want to do a good job of mobile phone software, then Europe, or more specifically, Scandinavia, is the place to be – not Seattle.

Most mobile phone manufacturers are aware of this and it would be a huge shame if CE won out. A more likely scenario is that we'll see a proliferation of both types of devices. Some manufacturers may jump the CE way because they don't want an operating system controlled by their rivals. Some may opt for Symbian because they don't want their future controlled by Microsoft. Both camps will spread fear and lies about time to market but the whole area is going to take a lot of shaking out.

CONTACTS

Simon Rockman welcomes your comments on the pda and mobile devices column. Contact him via the PCW editorial office or email: pda@pcw.co.uk. Please do not send unsolicited file attachments.



Online troubleshooting

If you're having trouble with your web connection, Roger Gann can get to the root of the problem

Several issues ago I looked at basic Ethernet troubleshooting. This month it's the turn of TCP/IP and Internet networking. If you're having problems connecting to a web server on an intranet or the Internet, there could be a number of causes, such as:

- The server is down or defective
- Your web browser isn't configured properly
- The TCP/IP configuration for your dial-up connection to your ISP is incorrect
- Your ISP's Domain Name Service (DNS) server is not working properly

To determine and resolve this problem try out the following steps, checking after each to see whether or not the connection has been restored.

Try a good known server: If you can't connect to one web server, try another, using its fully qualified domain name (FQDN), such as www.yahoo.com.

If you can connect to such a website, using its FQDN, then your computer's TCP/IP configuration is correct. It's therefore likely that the other site was down or in some way defective.

If you are able to connect to the Yahoo! website but not to another specific Internet site after several attempts, the other site may not be functioning properly or may be temporarily removed from the Internet.

However, if you can't connect to any websites, there may be a problem with your Internet browser's configuration or with the TCP/IP configuration for your dial-up connection to your ISP.

Verify your browser configuration: Check that your browser is configured to connect to the Internet using the dial-up connection to your ISP and not configured to go through a proxy server. **Confirm your IP address:** Although most ISPs allocate dynamic IP addresses, a few still assign static IP ones. To verify that the TCP/IP configuration for your dial-up connection to your ISP contains the correct information provided by your ISP, connect to your ISP, open a DOS window and type this command at a command prompt (see screenshot 1):

```
ipconfig /all
```

```

C:\>ipconfig /all

Windows 2000 IP Configuration

Host Name . . . . . : calapan-300
Primary DNS Suffix . . . . . : 
Node Type . . . . . : Broadcast
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No
DNS Suffix Search List. . . . . : LONDONFIELDS

Ethernet adapter Local Area Connection1:

Connection-specific DNS Suffix . . : LONDONFIELDS
Description . . . . . : 3Com EtherLink XL 10/100 PCI NIC (3C905-TX)
Physical Address. . . . . : 00-60-77-81-C7-85
DHCP Enabled. . . . . : Yes
Autotransformation Enabled . . . . : Yes
IP Address. . . . . : 10.0.0.4
Subnet Mask . . . . . : 255.255.255.224
Default Gateway . . . . . : 10.0.0.1
DHCP Server . . . . . : 10.0.0.1
DNS Servers . . . . . : 10.0.0.1
Lease Obtained. . . . . : 04 December 2000 01:35:39
Lease Expires . . . . . : 05 December 2000 01:35:39
  
```

Screenshot 1

Open a DOS window and verify your IP address at a command prompt

This displays Windows TCP/IP settings for all network adaptors and modem connections. Alternatively, if you have Windows 9x, launch WINIPCFG from the Run... dialog (screenshot 2). If the IP address displayed for your dial-up connection to your ISP does not match the IP address provided by your ISP, change your IP address to match the settings provided by your ISP.

Check the modem status lights: If you connect to a local network using a network card and to your ISP using a modem simultaneously, a conflict

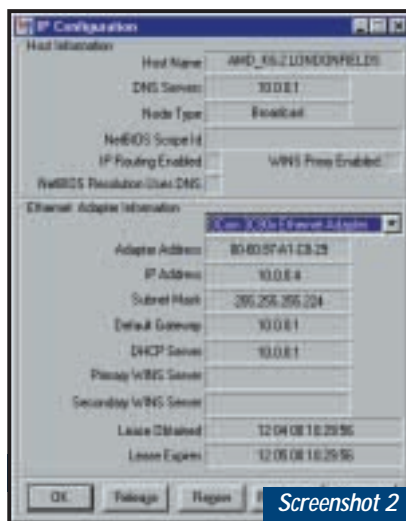
between your network adaptor and your modem can prevent your modem from sending information to servers on the Internet. To verify that TCP/IP packets are being routed through your modem to your ISP, connect and log on to your ISP. Next, use the ping command to cause your modem to send information. Ping is the principal network troubleshooting tool, a sort of network echo sounder (by the way, ping stands for Packet InterNetGroper – bet you didn't know that!). Armed with ping you can check the connectivity of your network very quickly. Ping sends a packet from one device, attempts to 'bounce' it off another, and 'listens' for the reply. If you get a prompt reply then the bit of network between the pinging device and the 'pinged' one is okay.

Open a DOS window and type the following command at the prompt:

```
ping <IP address>
```

where <IP address> is the IP address of a known good server on the Internet. If you don't know the address of a server on the Internet, use the IP address for www.vnu.co.uk, 212.161.108.129 (screenshot 3).

The Modem Status applet ought to flash but if the 'front PC' doesn't flash when you ping a server on the Internet, packets are not being routed through your modem. Verify that the IP address



Screenshot 2

Launch WINIPCFG for Windows 9x



```
C:\>ping 212.161.188.129
Pinging 212.161.188.129 with 32 bytes of data:
Reply from 212.161.188.129: bytes=32 time=40ms TTL=244
Reply from 212.161.188.129: bytes=32 time=40ms TTL=244
Reply from 212.161.188.129: bytes=32 time=41ms TTL=244
Reply from 212.161.188.129: bytes=32 time=70ms TTL=244
Ping statistics for 212.161.188.129:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milliseconds:
        Minimum = 40ms, Maximum = 70ms, Average = 47ms
C:\>
```

Screenshot 3

Ping enables you to check the connectivity of your network

assigned to you by your ISP for your dial-up connection is not the same as the IP address for your network adaptor or loopback driver (if installed). Also, the IP address of your network adaptor or loopback driver should not be on the same network as the IP address assigned to your dial-up connection. You should also check that a response is returned from the dial-up server on the Internet that you're pinging – this is the 'PC' at the rear of the modem status indicator, which should flash.

You should then ping your local 'loopback' connector at 127.0.0.1. If you get a response then at least you've got your TCP/IP stack correctly in place. Next, on a network, try pinging another PC on the same hub. If it works, then try pinging a PC on a different hub – this checks the connectivity between hubs. Next, if your network has one, try pinging a bridge or router. And so on.

Ping interpretation: The ways in which ping may fail can sometimes indicate what's wrong. Failure messages are: 'No answer from <destination>' or 'No reply from <destination>' or 'Request timed out'.

This is the most usual failure you'll see, and it indicates that your local system at least thinks it knows how to get to the destination. Note that many popular websites now disregard ping requests, so this isn't necessarily indicative of a problem at the other end!

ICMP Host unreachable from gateway: This is an interesting one and indicates that, while your system knows that it needs to get to the destination via a gateway, the gateway itself doesn't know how to route packets on. It may be that you have set the local gateway address incorrectly and does not necessarily indicate a network problem. So don't go thinking that the Microsoft website has

gone to sleep merely because pings to www.microsoft.com aren't returned!

<destination> is unreachable: This indicates that your local system doesn't know how to get to the destination. The most likely cause is a lack of routing information.

Test domain name resolution: A Domain Name Service (DNS) server provides host name resolution. If you can't connect to a server on the Internet using its fully qualified domain name, there may be a problem with the DNS configuration of your dial-up connection to your ISP or with your ISP's DNS server. Again, few ISPs specify the DNS IP address but most will assign this information dynamically as you connect. Again, use the ipconfig /all command (as described above) to display the IP address of your DNS server. If the IP address for a DNS server is not displayed, contact your ISP to get the information.

Check that you can communicate with your DNS server by pinging its IP address. If you can ping the IP address, but can't connect to a website using its FQDN, then the DNS server may not be resolving host names properly. If more than one DNS server is available for your ISP, configure your computer to use a different one. If using another DNS server resolves the problem, contact your ISP to correct the original.

Ping can be useful for much more than determining if a host is connected; it can also give some indication of network delays and how reliable packet delivery is for a given time.

Creating a PPP log: When you try your connection, Windows 9x writes a file called ppplog.txt to the Windows directory and you can use Notepad to view it. To turn on this useful troubleshooting feature, right-click on Network Neighborhood, select Properties and select Dial-Up Adaptor. Click Properties and click on Advanced.

Set 'Record a log file' to Yes and click OK. When you've finished troubleshooting, don't forget to return the 'Record a log file' setting to No, or Windows 9x will write a log every time you connect.

Other TCP/IP tools: Although Windows 9x and Windows NT4 don't ship with the complete range of 'standard TCP/IP tools, they do ship with most of them.

These are all DOS-style programs that have to be run in a DOS window, though there are plenty of shareware GUI versions available on the web.

tracert: Short for traceroute, this utility is useful to identify the route through which information flows from one host to another; it can also reveal slow links.

After using tracert to determine the intermediate hops between your machine and the destination machine, you can then use ping to test where the source of packet loss is located, by pinging the IP address of each hop in turn.

netstat: The netstat command is useful for reporting different connections and problem summaries for the networking interfaces. Ideally, collisions should be less than five per cent of the output packets; a proportion greater than 10 per cent indicates a problem. Also, the input and output errors should be less than one per cent of the input and output packets; if these numbers are higher, you probably have a network problem. If you suspect a problem you can:

- Check all systems for more machines with high input or output errors
- Check for loose wiring/connectors
- Check for correct termination (thinnet) – must be 50ohm terminators

nslookup: Not available under Windows 9x, nslookup is supplied with Windows NT4 and is useful for finding more information about a given host. Typing a question mark (?) at the prompt after you have entered the command will return a list of options.

arp: arp is useful for determining which machines are requesting services or are connected to your machine.

More on these and other network diagnostic software next month!

CONTACTS

Roger Gann welcomes your comments on the Networks column. Contact him via the PCW editorial office or email:

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BE CLEAR ABOUT SUPPORT AND WARRANTIES

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SET DELIVERY DATE AND CHECK WHAT IS DELIVERED

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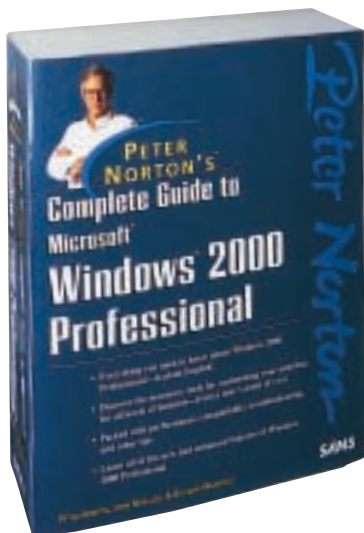
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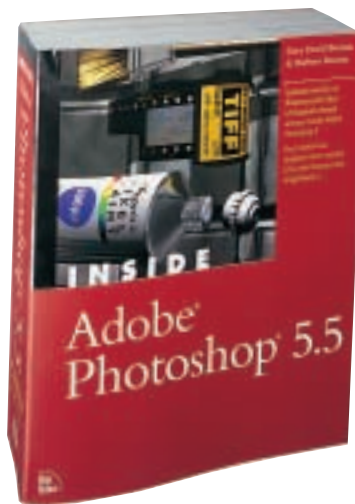
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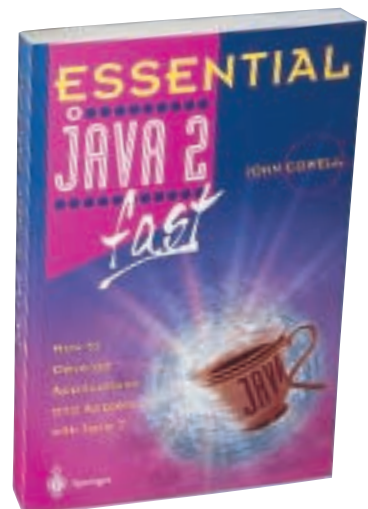
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Tribes 2

A major hit on the other side of the pond, Sierra Studios' Starsiege: Tribes was among the first frag fests to make the most of online gaming. Today no self-respecting shoot-'em-up would be seen dead without a multiplayer option. Dynamix hopes to become king of the hill with the release of Tribes 2 later this year.

Not only is it specifically designed to be played over the Internet or LAN, but it focuses on team-based co-operative play. Tribes 2 will be released with a full suite of tools to allow players to build an online team community with instant messaging, forums and ready-made web pages.

Set within a selection of expansive landscapes, the game is filled with fortresses, peaks and gorges. You traverse the battlefield by jet pack, 'ski' down the slopes or use one of the many ground and aircraft at each team's disposal.

You select – at a special location – which armour and weaponry to use, your choices being important in defining your role within the tribe.

At least eight different types of mission feature in the game, including defend and destroy, death match, and a number of



variations of capture the flag. You have a choice of five different tribes to join within games supporting up to 64 players at a time. Newcomers have the benefit of single-player missions and training options to ease them into the action.

If you already spend a lot of time on the Internet don't ignore this call to arms. www.sierrastudios.com/games/tribes2/

ANDY STEWART

Severance: Blade of Darkness

Following close on the heels of sword and sorcery role-playing action game Rune, comes Codemasters' Severance: Blade of Darkness, which promises to be a feast for the eyes, provided you can get beyond the absurdly convoluted storyline – something about a big disagreement between the gods of light and darkness.

You have the choice of being one of four brave warriors: a knight, a dwarf, an amazonian and a barbarian. Each follows their own story through the game and each brings their own style of fighting and skills, which you can build upon as you progress through the game.

The game is all about light (the good guys) and darkness (the evil that



threatens to engulf the world) and the graphics work hard to do them justice. Torches flicker, illuminating the immediate surroundings and casting eerie shadows, while veils of mist hang over shimmering lakes.

Rather than just looking pretty, these

effects also serve a purpose when it comes to the gameplay – you can use the shadows to creep up on an adversary while other characters' shadows can give their hiding places away.

However, it's in the fighting that the game comes into its own, the strength of your strikes can depend on what combination of mouse movements and keystrokes you employ. Subsequently, the harder you fight the more your stamina suffers and the more vulnerable you become. Marry all this with a realistic physics engine and you have a game with the potential for becoming a genre leader.

www.codemasters.com/severance/index.html

ANDY STEWART



Gunman Chronicles

Space meets the Wild West as Sierra Studios reaches a new frontier in sci-fi shoot-'em-ups

In a marketplace filled with decent first-person action games, the need to stand out from the crowd is essential. So, while many current shoot-'em-ups opt for a modern-day military theme, Sierra Studios' latest goes against the grain by being a Western set in space.

In the dim and distant future Gunman Chronicles puts you in the role of Major Archer, commanding a platoon of Gunmen assigned to rid the galaxy of malevolent aliens known as Xenomes – genetically mutated creatures threatening humanity's colonisation of the planets. So far, so Starship Troopers.

Aside from a leading villain with a score to settle, you must face dinosaurs and rampaging robots before the final showdown in the bowels of an underground laboratory. The frontiers of space and the Wild West collide in an imaginative way throughout the game, serving as a distraction from what is otherwise quite familiar gameplay.

Gunman Chronicles has had quite a unique genesis, beginning life as it did among a group of Half-Life fans who were building their own modified version of the classic game. When their work came to the attention of Sierra it was decided to develop it into a fully-fledged game. Under the name of Revolver Software these armchair developers put together Gunman despite being spread around the globe from California to Australia via Slovenia and South Africa.

This may explain the eclectic mix of genres, which, for better or worse, gives you the chance to face a wide variety of foes and put a pretty impressive smörgåsbord of weaponry to the test. Each planet has a distinctive look, which helps to keep your interest.



Gunman's main outstanding feature, however, is that many of the guns are configurable – you can change their settings to suit your circumstances. So the pistol that you first acquire has four settings plus a sniper mode. The meanest of the lot, a rocket launcher known as the M.U.L.E. lets you change its ammunition, how it is detonated and what kind of flight path it takes. Individual rockets can even be taken apart to serve as makeshift grenades. Later on you get a Chem gun whose chemical payload can be mixed in order to have a greater effect. Even with this amazing diversity of fire power you'd better hope you've got the right configuration should you suddenly be ambushed, otherwise you might as well be packing a pea shooter.

You'll learn how to use all these in a

neat tutorial that plays out prior to you being dispatched to the planet surface. – during training you get to drive a tank, which will prove invaluable later on.

However, the new guns and vehicles only go so far to improve on the original game. For seasoned fans of Half-Life, many elements of the game will already be familiar, if dressed slightly differently. The initially impressive landscapes of each planet soon become claustrophobic with little opportunity to explore beyond the parameters of the game and too few secrets to uncover. The opening firefight launching the adventure by wiping out your platoon is undoubtedly impressive but suggests Gunman will be more of an incessant frag fest than it actually is. Subsequent puzzles that hinder your progress also prove to be nothing new.

It goes without saying that Gunman Chronicles features a multiplayer option, which can support up to 32 players at a time – currently only for death match or team death match options.

Ultimately, despite its pedigree, Gunman brings very few new elements to the party – best suited to sci-fi fans looking for a new shoot-'em-up, or Half-Life fans looking for a change of scene.

ANDY STEWART

DETAILS

★★★★

PRICE £29.99 inc VAT

CONTACT Sierra Studios 01752 206 010

www.sierra-online.co.uk

SYSTEM REQUIREMENTS

Windows 95, 98, 2000, Me, NT4, Pentium 233, 32MB of RAM, four-speed CD-ROM, 400MB free hard disk space

Delta Force: Land Warrior

The sequel to Delta Force 2 brings further multiplayer options and firepower with a bigger kick

The best thing about getting your hands on a sequel is that you know it has been worked on since you played the last instalment – if the developers have got any sense, they'll have listened to the gripes of players and updated the game accordingly.

The biggest disappointment with Delta Force 2 was the poor response from the enemy and the way they often stumbled around aimlessly. If you're holding your breath waiting to hear that this has been fixed then let it out now – you're in for more of the same. The AI has been updated with neat touches such as the enemies' ability to hear and come looking for you, but a number of flaws remain, such as the enemies' inability to realise they can't walk through walls.

On the plus side, the AI of the other soldiers helping you on your missions has been beefed up – they are no longer token characters tagging along for the ride – their aim has dramatically improved and they will often take out enemy soldiers before you get the chance.

There are also new weapons to get your hands on, including different assault rifles, an excellent grenade launcher and an underwater rifle that shoots darts.

The way you use weapons has been improved. They now have a much bigger kick – plant yourself behind one of the mounted guns and you'll find the gun pulls up and away from you with each shot. Sniper fans will have to watch how much ammo they're shooting off, because when it's time to change the clip you lose the view through the sight and your target may have gone by the time you come back to focus on it.

The graphics still leave a lot to be desired, despite the coders having cooked up a new engine that uses voxels to create the landscapes. Some of the locations are well presented and the excellent Egyptian scenario is worth a peek even if you don't play any of the other missions.

The stealth element of Delta Force has always been its big selling point with gamers, but with 30 single-player levels it soon becomes a tad dull. You tend to get a bit fed up of having to be over cautious with every move to avoid getting a bullet in your gut. It takes only a single shot to kill you or your enemies – and you're not the only one packing a sniper rifle.



The best aspect of Delta Force is the multiplayer options, and this is where the stealth element becomes much more thrilling. The game can simultaneously support up to 50 players, giving lots of scope for full-on team battles. Don't just load up on snipers though, as you'll need men carrying all kinds of weaponry to succeed against other players.

NovaLogic has also updated its online service with the launch of NovaWorld 2. Regular players will now be rewarded with experience, ranks, promotions and even medals for their actions in battle.

While taking a few tiny steps forward, this version is not really that different from Delta Force 2. We can only hope that the next Delta Force finally sorts out the frustrating enemy AI.

MATT CHAPMAN

There are other problems with the missions, too. They are so regimented that they feel scripted. You have to follow set procedures, which are far too linear for an enjoyable gaming experience – you can't succeed just by strapping on the biggest guns around and running at the enemy. The AI might be stupid, but if you make yourself an easy target you'll be killed – especially in later levels. This version of the game includes a mission editor, so if you're getting bored you can always try to create something better.

DETAILS

★★★

PRICE £39.99 inc VAT

CONTACT Novalogic 020 7405 1777

www.novalogic.com

SYSTEM REQUIREMENTS Windows 95, 98, Me, 2000, Pentium 400/Celeron 400, 64MB of RAM (128MB recommended), four-speed CD-ROM, Direct 3D-Compatible Video Card, DirectX 7or greater, 200MB free hard disk space



Insane

You'd be mad to miss this online game

It's difficult to think of an online game without either large weapons with ridiculous names such as Super Duper Vaporiser, or wizards with magical powers wandering around an isometric landscape. Obviously this hasn't gone unnoticed at Codemasters, so the company has decided to throw out the rule book when it comes to online gaming and develop something for those of us who think that all a good game needs in terms of control is accelerator and brake buttons plus steer left or right controls. The question, of course, is does the game live up to its hyperbolic title, or is it only slightly unhinged?

Insane aims to turn you into the virtual equivalent of the two ridiculous off-roader dudes from the TV's *The Fast Show*. Well, it might not be quite as bad as that, but you are presented with a huge range of off-road vehicles from which to choose. These vary from small dune-buggy-type vehicles to full on 4 x 4 monsters.

In single-player mode there are a number of race options: Championship, Quick Race and Practice. Championship mode has five different classes, with each class built around different vehicle types. You start off with the 4 x 4 class and work your way up through Sports, Pickups and Trucks until you get to the Extreme vehicles. There's a total of 25 different motors, including the extra sets of wheels you get as rewards during the Championship mode.

Codemasters has got a pretty accurate physics model blended into the game, so each vehicle has its own mass and centre of gravity, along with other features such as horsepower and handling. Picking a small, lightweight buggy means that you're likely to bounce around any undulations in the landscape, while a large, heavy 4 x 4



beast will tend to hold its ground a bit more. However, vehicles with a higher centre of gravity are more likely to roll over and leave you sitting upside down, so it's important to adjust your driving to suit the terrain and the type of motor you are controlling.

The game doesn't really have what you could describe as tracks. Instead you race across rugged terrain in locations ranging from Ireland to Utah. You are given the freedom to drive wherever you want in each stage. There are, however, objectives to each of the seven game modes. These are all variations on racing through gates or hunting down opponents to capture the flag, but all are enjoyable nonetheless.

The graphics aren't exactly stunning, although the vehicles are well modelled with flailing mud flaps and realtime damage to the cars. The main disappointment is with the levels themselves – they could have done with a tad more variation, but then again each has some good points such as the animated buffalo on the Utah stage.

The single-player mode starts out promising enough as it's great fun bumping across the open terrain and watching your car fall spectacularly off the side of a cliff, and the computer opponents offer up some convincing competition across all the difficulty



levels. They can even become quite devious, ramming you out of the way just as you're about to get through a gate to steal a crucial couple of points.

However, the game soon begins to get repetitive and some of the events are overly long and don't hold your attention. Even the novelty of driving your 4 x 4 off the side of a mountain to see how much damage you can inflict fades after a while. But then that's not really what Insane is about.

The game was developed as the launch title for the developers' new online gaming network called Codemasters' Multiplay Network. Take the game online and the repetition of the single-player mode is soon a distant memory. Once you know you're up against real opponents, either across the Internet or on a LAN, the game kicks back into life and really starts to show its colours.

As a single-player game, Insane's appeal is limited, but if you buy with online play in mind then you'll surely believe it lives up to its over-the-top name.

NIALL MAGENNIS

DETAILS

★★★★

PRICE £19.99 inc VAT

CONTACT Codemasters 01926 814 132

www.codemasters.com

SYSTEM REQUIREMENTS Windows 95, 98, Me, 2000, Pentium II 233, 64MB of RAM (128MB recommended), four-speed CD-ROM, Direct 3D-Compatible Video Card, DirectX 7 or greater, 100MB free hard disk space

Tiger Woods PGA Tour

Now you can partner your favourite Pro in the President's Cup

The weather's bad and your golf clubs are sitting in the cupboard under the stairs.

What are you going to do? Three options: indoor putting with a device that might return the ball, pop down to the golf range, or get yourself one of the latest golf sims – Tiger Woods PGA Tour 2001.

This is the updated version of last year's Tour, but don't expect major changes. The gameplay and the engine are practically the same with the only major additions being two new players – Stuart Appleby and Jim Furyk – and the opportunity to play in the President's Cup where you can partner your favourite Pro in international team match play.

Even though little is different, the 17 courses – including new Tournament Players' Courses at Sugarloaf and River Highlands – are beautifully rendered, while the digitised motion-capture videos



of the players, especially Tiger, are very smooth and realistic. The game also supports a maximum resolution of 1,600 x 1,200 – we found 1,024 x 768 to be the best balance between performance and sharpness. Commentary is helpful and entertaining but with few ambient sounds included, it lacks atmospheric realism.

A swing meter graphically represents your swing and is mouse-controlled either

by the three-click method, a one-click swing or a realtime one using the motion of the mouse to simulate the swing – the driving range, chipping and putting greens, and practice holes will be handy before sudden-death matches or an entire Tour.

Tiger Woods PGA Tour 2001 is fun to play but, even with a course architect and support for Internet and LAN play, like Links 2001, it's not as realistic.

JALAL WERFALLI

DETAILS

★★★★★

PRICE £29.99 inc VAT

CONTACT Contact Electronic Arts
0870 243 2435 www.easports.ea.com

SYSTEM REQUIREMENTS Pentium 200MHz; 32MB of RAM; 2MB video card; DirectX 7a-compatible sound card; four-speed CD-ROM; 100MB hard drive space, Windows 95, 98, modem or network card (online gaming)

Chessmaster 8000

Not just any old chess game, this release is the best choice if you want to challenge the masters

The latest in the long-running Chessmaster series uses version 3.12 of 'The King engine' – one of the most powerful chess engines available on the PC. This release features improved graphics with new chess sets and boards. There are now also over 170 opponents – 39 of them styled after famous Grand Masters. Commentary can be switched on or off and set to just comment on the action, or to give hints.

As with previous Chessmaster games you are initially presented with an interface showing seven icons. These lead you to the Game Room, Classroom, Tournament Hall, Library, Database Room, Kids Room, and the CMLive Room. In the Game Room you can play unrated games where you can take moves back, get advice and receive coaching. You can also build custom players with different styles of play and select the design of the pieces and 2D/3D boards.

To improve your knowledge of the



game head to the Classroom for tutorials, drills and 'Match the Masters' – by playing through chess masters' games.

The Tournament Hall is where all the serious stuff takes place, with options to play rated games that influence your overall standing. No advice or second chances here, just full-on tournament play.

Chessmaster 8000 has a lot more depth than your average chess game. The Library holds over 700 of the most famous chess games played throughout history – you can select one and listen to the commentary. Loads of new

games in the Database Room allow the enthusiast to search and view individual match statistics; the Kids Room offers a friendly start to the basics of chess, while the CMLive Room allows you to host, join or challenge your fellow Chessmaster users in an online game.

If you play chess or want to learn how to, Chessmaster 8000 is a good choice, offering something for everyone.

JALAL WERFALLI

DETAILS

★★★★★

PRICE £29.99 inc VAT

CONTACT
Mattel Interactive 01664 481 563
www.chessmaster.com

SYSTEM REQUIREMENTS Pentium II 233MHz, 48MB of RAM, 2MB video card, 16bit sound card, four-speed CD-ROM, 80MB hard drive space, Windows 95, 98, modem for Internet or LAN play



WIN!

PRIZES WORTH £1,870

Measuring 3.5 x 5.75in and weighing only 360g, LaCie's PocketDrive is one of the world's smallest hard drives and the first peripheral to offer both USB and FireWire (IEEE 1394) support or 'U&I' in one drive.

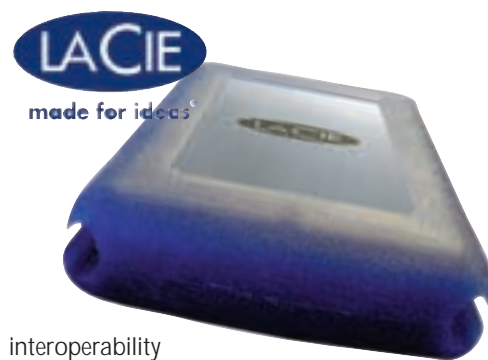
The LaCie U&I PocketDrive is an excellent way of expanding storage for laptops and PCs, providing high capacity, fast access, reliability and mobility in a compact design. Available in 10, 20 and 30GB options, the drive has a sustained transfer rate of 14Mbytes/sec and provides the vital extra storage capacity required when using Digital Video (DV).

Users can quickly share the contents of the entire drive with others,

using it as a data shuttle. LaCie's U&I PocketDrive proves itself particularly useful for mobile professionals as data can quickly be transferred from laptop to desktop and vice versa. Furthermore, The PocketDrive can also be powered through the FireWire interface for true mobile computing.

The rugged shock-resistant silicon bumper stands up to the knocks and bumps of travelling. A handy groove running along the ergonomic bumper holds untidy cables in place.

The versatility of this compact drive, combined with the cross-platform



interoperability and the ability to quickly share large files with the U&I connectivity, demonstrates why these compact PocketDrives have been so popular.

■ *For a chance to win one of three LaCie 10GB U&I PocketDrive, just answer this simple question and follow the 'How to enter' instructions on the opposite page.*

How much does the LaCie U&I PocketDrive weigh?

PCW March 2001 LaCie competition entry form

Name:

Email address:

Daytime telephone number:

Address:

Answer: The LaCie PocketDrive weighs:

• Please tick here if you DO NOT want to receive information about other products and services from VNU Business Publications Ltd

• Please tick here if you DO want your details to be passed on to other carefully selected companies for marketing purposes

Rules of entry

This competition is open to UK readers of *Personal Computer World*, except for employees (and their families) of VNU Business Publications, LaCie and Macromedia. *PCW* is the sole judge of the competition, and our decision is final. No cash alternative is available in lieu of prizes.

January competition winners

The winners of January's competition to win a copy of Windows Professional are: Trevor Jones of Wirral, Richard Sharp from Dundee, and Pauline Taft from Cheshire. The winner of the Mesh Matrix 1000MAX is: Andrew Chaddock from Cheshire

THREE LACIE POCKETDRIVES AND TWO DREAMWEAVER COMBOS UP FOR GRABS THIS MONTH

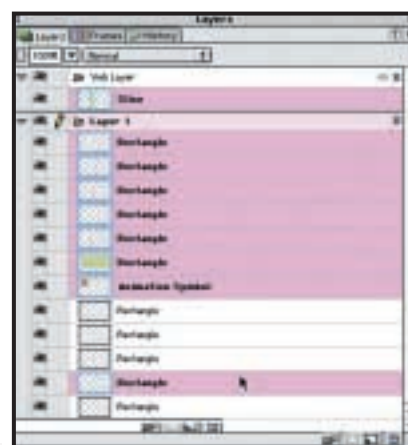
The Dreamweaver 4 Fireworks 4 Studio is the leading professional integrated development solution for website design and creation. This is achieved through integrated product features and a shared Macromedia User Interface making it easy to create, edit and animate web graphics in Fireworks and incorporate them seamlessly with Dreamweaver. Fireworks allows you to design and optimise vector and bitmap graphics and sophisticated pop-up JavaScript menus, while Dreamweaver allows the user to complete site development using either the page layout technique or working entirely in the hand-coding environment.

The Dreamweaver UltraDev 4 Fireworks 4 Studio is the first visual solution that lets developers quickly create database-driven web applications for multiple server platforms. Based on



the Dreamweaver platform, UltraDev 4 allows the user to build database-driven web applications swiftly and easily, eliminates the need to be able to hand code ASP, JSP and CFML because, as with Dreamweaver 4, the user is able to work in a WYSIWYG environment. Coders may also work within the integrated text editor, thus meeting the demands of both type of developer.

Dreamweaver UltraDev 4 allows full synchronisation with Dreamweaver 4 and Fireworks, creating a seamless working environment. The Roundtrip



Graphics Editing between Dreamweaver UltraDev 4 and Fireworks 4 offers a smooth graphics and HTML editing process which allows the user to launch-and-edit and launch-and-optimise graphics quickly and easily using Fireworks 4.

■ For a chance to win either Dreamweaver 4 and Fireworks 4 or Dreamweaver UltraDev 4 Fireworks Studio, answer this question and follow the 'How to enter' instructions.

What type of web application does UltraDev 4 allow the user to build?

How to enter

Fill in the coupon(s) and send to the following address by 28 February 2001:

March competition
Personal Computer World
VNU Business Publications,
32-34 Broadwick Street,
London W1A 2HG

Or email your answer, name, address and daytime telephone number to us at

pcw_competition@vnu.co.uk
(NB PLEASE SPECIFY LA CIE OR MACROMEDIA)

Please state in your email if you DO NOT wish to receive information about other products and services from VNU Business Publications Ltd, and if you DO want your details to be passed to other carefully selected companies for marketing purposes.

◆ Competition open to UK residents only

PCW March 2001 Macromedia competition entry form

Name:

Email address:

Daytime telephone number:

Address:

Answer: The type of web application UltraDev allows the user to build is:

• Please tick here if you DO NOT want to receive information about other products and services from VNU Business Publications Ltd

• Please tick here if you DO want your details to be passed on to other carefully selected companies for marketing purposes

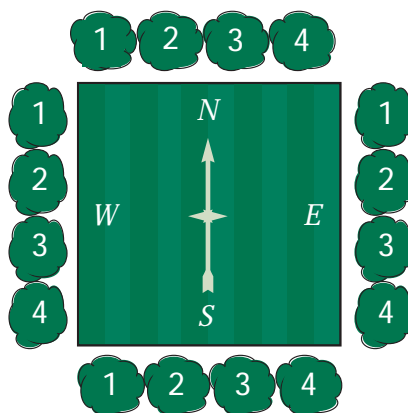
An apple a day

Farmer Bramley's 16 apple trees are laid out as shown in the diagram. This year, they've just started to fruit and each one bore a different number of apples.

One tree bore just one apple, while the other 15 had between three and 17 apples, with no two trees bearing the same number. Furthermore, no tree bore a number of apples corresponding to its position number in the diagram or (excluding 1) a multiple thereof. No two adjacent trees (including the pairs at each corner) bore consecutive numbers of apples.

The tree at N3 bore two fewer apples than the one at E2. N1 bore four fewer apples than E4, but three more than S3. The tree at N2 had one more apple than the one at W3, but one fewer than E1. Each of these last three had a single-digit tally. W1 bore seven more apples than N4. S2 had two more than W4, but five fewer than E3. The total number of apples from the four trees on the northern side was two fewer than the total from the four trees on the southern side.

Can you work out how many apples each tree bore?



Tree	No.	Tree	No.
N1		S1	
N2		S2	
N3		S3	
N4		S4	
E1		W1	
E2		W2	
E3		W3	
E4		W4	

If you correctly complete the table above you're in with a chance of winning a copy of Encarta Reference Suite 2001. Send the answers, along with your



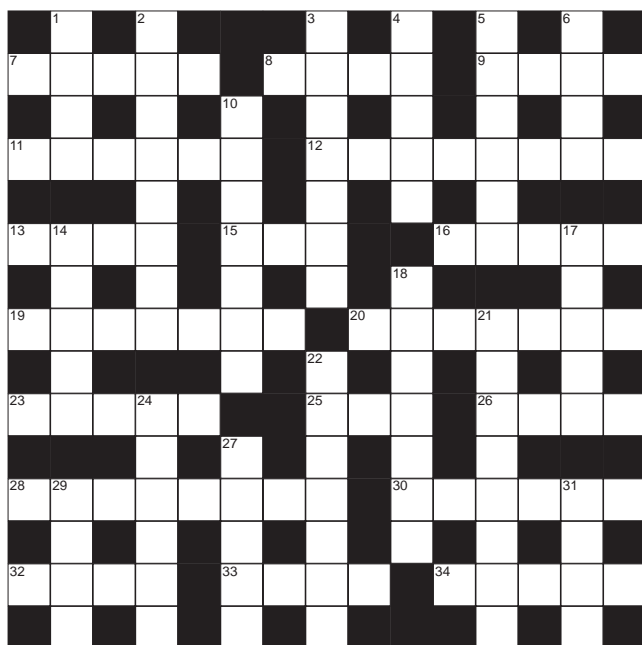
name and an address where you would like the prize to be mailed, on a postcard to: PCWPrize Puzzle (March 2001), VNU House, 32-34 Broadwick Street, London W1A 2HG, or by email to: letters@pcw.co.uk.

Answers should arrive no later than 20 February 2001. Please note that we DO NOT open attachments.

December's Prize Puzzle answer

The solution to December's puzzle is: House number 1: Nitidus, 28, joiner; 2: Radius, 40, wheelwright; 3: Industrious, 32, bookkeeper; 4: Dexterus, 22, painter; 5: Rotundus, 34, security guard. Congratulations to this month's winner, PH Tanner of Glasgow.

prize crossword



ACROSS

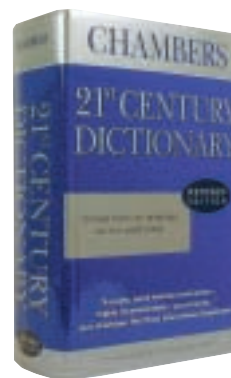
- 7 Infectious program? (5)
- 8 Not functioning (computers) (4)
- 9 Only receive newsgroup messages (4)

- 11 Embedded one construct inside another (6)
- 12 Program's executing statements (4,4)
- 13 Fixed-width type font (4)

- 15 Chip's prong (3)
- 16 Connectors (5)
- 19 Erased a file (7)
- 20 Windows options control (4,3)
- 23 Very small time measures (5)
- 25 ___ slot, connection (init) (3)
- 26 Clever with Corel Draw? (4)
- 28 ___ coupler, communications device (8)
- 30 File's size measure (6)
- 32 Short systems description (4)
- 33 Data storage method (1,1,1,1)
- 34 Data input (5)

DOWN

- 1 Have a meal (4)
- 2 Travel bag (8)
- 3 Thriving (7)
- 4 Large Asian republic (5)
- 5 Of the whole world (6)
- 6 Placed a foot (4)
- 10 Took over (7)
- 14 Plans (5)
- 17 Ghoul (5)
- 18 Lastly (7)
- 21 Instruction (8)
- 22 Contribution (7)
- 24 Building for Christian worship (6)
- 27 Heavenly bodies (5)
- 29 Reproduction (4)
- 31 Small pie (4)



Each month, one lucky PCW Crossword entrant could win a copy of the Chambers 21st Century Dictionary. The January crossword proved too much with no-one getting the right solution, so no winner this month. You could be a winner. Send your completed crossword to: 'PCW March - Prize Crossword', VNU House, 32-34 Broadwick Street, London W1A 2HG, to arrive no later than 13 February 2001. Please state clearly on your entry if you do not wish to receive promotional material from other companies.

Solutions to February's crossword

- ACROSS**
 7 Fiche 8 Dead 9 Ends 11 Amends 12 Tailored 13 Pico 15 Ada 16 Atapi 19 Layered 20 Emitter 23 Relay 25 Hot 26 Nest 28 Installs 30 Ejects 32 Into 33 Clip 34 V Chip
DOWN 1 Firm 2 Shin-Bone 3 Best Man 4 Admit 5 Resort 6 Idle 10 Escapes 14 Irrate 17 Poems 18 Omitted 21 Tendency 22 Chassis 24 Action 27 Black 29 Nine 31 Trip

A BBC micro, a mouse and Charlton Heston are just some of the skeletons in this month's closet

20 YEARS AGO March 1981



Those familiar puppets from the political satire show *Spitting Image* made an appearance on the front cover of *PCW* 20 years ago. This time they weren't sending up anyone in

particular, but instead depicted two businessmen standing over *PCW*'s benchtest of the Onyx C8002 multi-user system. This was *PCW*'s first multi-user test and Sue Eisenbach was impressed. Although its looks were bland, Sue found two 4MHz processors inside; the Z8002 and Z80A. The latter was fitted to the 64K mass controller board that in turn supported the 10MB IMI 7710 Winchester hard disk. A magnetic backup drive was also included in the base model configured for four users at a price of, wait for it, £17,160.

Over in the Newsprint section, Guy Kewney reported on a new approach to speech recognition by the National Physical Laboratory. They suggested that recognition systems based on words or phonemes are limited in their application, and were commonly trained for one voice. Instead NPL's system accepted continuous speech, and 'cleaned' it of its natural colour – intonation, pitch, speed and so on. Needless to say the resultant voice was on a par with that of the famous Texas Instruments' 'Speak and Spell'.

Finally, Chris Sadler and Sue Eisenbach took a look at Unix – the OS developed in 1969 at the Bell Labs by Ken Thompson and Dennis Ritchie. Still highly regarded today, Unix's strengths lay in its powerful shell command interpreter, a simple filing system, and its security system with encrypted user passwords and access rights.

15 YEARS AGO March 1986



This'll show your age: in March 1986 the Acorn BBC Master 128 graced the cover of *PCW*. As the base model of Acorn's new Master Series, this machine had the backing of the BBC, as

did Acorn's previous Model B. Aimed mainly at schools and educational establishments, Nick Walter concluded that it would retain its prominent

position as leader of the field. However, due to its price of £500, he felt that although it may have been the best 8bit micro on the market, it was too expensive for most home users.

As the ubiquitous mouse gained popularity in its many forms, users everywhere debated, as they still do today, whether the device was an easy, alternative to learning keyboard strokes, or if it was just too unsophisticated for the professional PC user. *PCW*'s Dennis Freeman made his mark in the big debate by challenging himself in a test of efficiency and speed using keystrokes versus the mouse in Microsoft Word on an Apricot Xi. Although keystrokes scored faster on four out of five of his tests, Dennis grudgingly concluded that the simplicity of just pointing to and clicking commands could be very tempting.

While JRR Tolkien fans eagerly await the new *Lord of the Rings* trilogy of films, we can look back with a fond smile at the game of the same name released by Melbourne House 15 years ago. Following the quest of the Hobbits to Rivendell, where they seek the advice of Elrond on the future of the Ring, players could take part as four of the different characters. Although *PCW*'s reviewer, Stephen Applebaum, saw the conversion of a classic book to a game akin to sacrilege, he recognised the game as a 'seamless, micro-based spectacle.'

10 YEARS AGO March 1991



As *PCW* proclaimed 1991 to be 'The Year of the Notebook,' the Texas Instruments TravelMate 3000 graced the cover of this issue. Even though notebooks had already been on the market for quite a few months, they had until now only been equipped with 286 processors. Although *PCW*'s Guy Swarbrick thought the notebook was a bit heavy at 5.7lb, he felt that with its 20MHz 80386SX processor it was by far the best notebook at the time.

With a costly laser and dry ice launch at the Hippodrome, 1991 saw the release of Microsoft Excel 3. Armed with a pre-production copy and a stack of large manuals, Steve Cassidy set about reviewing Microsoft's latest contribution to the world of spreadsheet programs. What he found was a genuinely improved product chock full of efficient

features, such as automatic column sizing, which he felt rewarded the users' investigation and creativity.

On the computer entertainment front, Guy Swarbrick took a close look at the booming popularity of Flight Simulator. Though seen as just a game by some, ardent devotees, including pilots, argued that the sophistication, realism and lack of an emphasis on fighting made it a program that should be taken more seriously than the average game. In fact, it was taken so seriously in the US that it inspired magazines, local clubs and even the Computer Pilots' Association of America.

5 YEARS AGO March 1996



150MHz Pentium chips that were 'built for speed' took the cover of this issue. Adele Dyer took a look at four machines equipped with the new chip: the Dan Ultimate 150MHz,

the Elonex PC-150/I, the Evesham Vale Platinum SE P150 and the Viglen Genie PCI P5/150. Although all were close to each other in performance tests and build quality, the Viglen came out top cost-wise at £2,107. However, the honour of Editor's Choice went to the Evesham Vale, which boasted a 2GB hard drive and performed the fastest.

Notebooks were yet again a hot topic in the *PCW* office. Improving every year, 1996 saw the first portables for the power user equipped with Intel Pentium 90 processors, which Dylan Armbrust took on the task of testing. The NEC Versa 4050H won him over with its small dimensions and portability. Another feature he enjoyed was the keyboard, which had fold-out feet that placed it on an angle and made typing easier.

The great Charlton Heston granted an audience to *PCW* in order to promote the CD-ROM 'Voyages of the Bible.' The interactive CD-ROM was the brainchild of the movie legend, who claimed that he was inspired by Steven Spielberg, who predicted that the CD-ROM was 'the future of the moving image.' Complete with Mr Heston's narration and graphics of ancient Palestine, our writer, Michael Hewitt, recommended 'Voyages of the Bible' as an excellent historical reference tool.

JANET HEIL AND JALAL WERFALLI

Nintendo's little wonder

Remember Mario and Zelda? Take a trip back to the mid-1980s with the amazing NES

By the end of its 10-year lifespan, the Nintendo Entertainment System (NES), had sold 62 million units and 500 million games worldwide. Introduced in Japan in 1983, it revitalised the dedicated games console market and forever stamped its creator's name into the world's collective conscience. From Donkey Kong to Super Mario, Nintendo has enjoyed unprecedented success in the electronic entertainment industry, but the company began life over a century before this success...

Back in 1889, Fusajiro Yamauchi, great-grandfather of Hiroshi Yamauchi, Nintendo's current president, began manufacturing 'Hanafuda', Japanese playing cards. It wasn't until the 1960s, when Hiroshi Yamauchi had taken over the reins, that the company began branching out into other games.

By 1970, Nintendo had forayed into electronic gaming with its beam gun series. Three years on saw its development of laser clay-pigeon shooting. But in 1976, Nintendo started experimenting with microprocessor-controlled video games and by 1978 had moved into selling microcomputer-based coin-operated machines.

Many people's first experiences of home video games were the original LCD handhelds from Nintendo – the company set up a wholly owned subsidiary – Nintendo of America (NOA) – in 1980 to produce this 'game and watch' product line. However, Nintendo really hit the world gaming map in 1981 with Donkey Kong. In one fell swoop, the platform genre and legend of Mario was born.

Meanwhile, the home video games market was in trouble. Home computers, which first displaced the original games consoles, were starting to wane in popularity. The boom was over.

The troubles that affected



other manufacturers didn't put off Nintendo. It launched its Family Computer, or Famicom system, in Japan in 1983. Designed by Masayuki Uemura, it debuted with Super Mario Brothers and both became instant hits.

After selling 2.5 million Famicons in Japan, Nintendo felt ready to try it out in the West. It approached US games giant, Atari, but negotiations failed and Nintendo took on the job of selling its own product in the US. To avoid any negative associations with home computers however, it was renamed the Nintendo Entertainment System. And, as a more 'attractive' offer, Nintendo sold the system with a small Robotic Operating Buddy. Despite interacting with the player and TV, ROB wasn't a big hit. The NES, however, was huge.

Amazingly, the NES didn't make it to Europe until 1987, by which time the classic Zelda had become the first Nintendo game to sell one million copies.

The NES was an 8bit machine, based around a customised Motorola 6502, running at 1.79MHz. The system featured 2KB of RAM and 2KB of dedicated video memory, driving the display at 256 x 240 pixels with 16 colours from a palette of 52. The maximum number of sprites on screen at any time was 64, and each could measure 8 x 8 or 8 x 16 pixels.

Japanese rival Sega fancied a fight, but its 8bit Master System only really enjoyed success in Europe. By the early 1990s, the 16bit battle had begun between the Super NES and the Sega MegaDrive. Sega later left

Nintendo to enjoy the 64bit world with its N64, but jumped back in the fray with its latest 128bit Dreamcast console. Meanwhile, Sony had taken over the world with PlayStation, a success that the new PS2 looks set to continue.

With consoles back in fashion and the market tougher than ever, it's important to remember the influence of the NES. It almost single-handedly rekindled the home video games market in the mid-1980s. It also introduced the joypad controller and made stars of Mario and Zelda. Nintendo is currently enjoying worldwide domination with Pokémon, and hyping its forthcoming GameCube console; the ubiquitous GameBoy is also about to enjoy an upgrade. Despite increasingly

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